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10 CFR 50.4

August 26, 2015
CNS-15-080

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U.S. Nuclear Regulatory Commission
Washington, DC 20555

Duke Energy Carolina, LLC (Duke Energy)
Catawba Nuclear Station, Units 1 and 2
Docket Numbers 50-413 and 50-414
Renewed License Numbers NPF-35 and NPF-52

Subject: Fifth Six-Month Status Report in Response to March 12, 2012 Commission Order Modifying Licenses With Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)

References:

1. Nuclear Regulatory Commission (NRC) Order Number EA-12-049, Order Modifying Licenses With Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events, Revision 0, dated March 12, 2012, (ADAMS Accession No. ML12054A735).
2. NRC Interim Staff Guidance 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, Revision 0, dated August 29, 2012 (ADAMS Accession No. ML12229A174).
3. NEI 12-06, *Diverse and Flexible Coping Strategies (FLEX) Implementation Guide*, Revision 0, dated August 2012 (ADAMS Accession No. ML12242A378).
4. Duke Energy's Initial Status Report in Response to March 12, 2012, Commission Order Modifying Licenses with Regard To Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order EA-12-049), dated October 29, 2012 (ADAMS Accession No. ML12307A023).
5. Catawba Nuclear Station Overall Integrated Plan in Response to March 12, 2012, Commission Order to Modify Licenses With Regard To Requirements for Mitigation Strategies for Beyond Design Basis External Events (Order EA-12-049), dated February 28, 2013.
6. Catawba Fourth Six-Month Report in Response to March 12, 2012, Commission Order to Modify Licenses With Regard To Requirements for Mitigation Strategies for Beyond Design Basis External Events (Order EA-12-049), dated February 26, 2015 (ADAMS Accession No. ML15061A124).

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Ladies and Gentlemen,

On March 12, 2012, the Nuclear Regulatory Commission (NRC) issued Order EA-12-049 (Reference 1) to Duke Energy. Reference 1 was immediately effective and directs Duke Energy to develop, implement, and maintain guidance and strategies to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities in the event of a beyond-design-basis external event. Specific requirements are outlined in Attachment 2 of Reference 1.

Reference 1 required submission of an initial status report 60 days following issuance of the final interim staff guidance (Reference 2) and an Overall Integrated Plan (OIP) pursuant to Section IV, Condition C. Reference 2 endorses industry guidance document NEI 12-06, Revision 0 (Reference 3) with clarification and exceptions identified in Reference 2. Reference 4 provided the initial status report regarding mitigation strategies at the Oconee, McGuire and Catawba Nuclear Stations. Reference 5 provided the Catawba OIP.

Reference 1 requires submission of a status report at six-month intervals following submittal of the overall integrated plan. Reference 3 provides direction regarding the content of the status reports. Reference 6 provides the fourth six-month status report for Catawba.

The purpose of this letter is to provide the fifth six-month status report pursuant to Section IV, Condition C.2, of Reference 1. The attached report provides an update of milestone accomplishments since the last status report, including any changes to the compliance method, schedule, or need for relief and the basis, if any.

This letter contains no new Regulatory Commitments and no revision to existing Regulatory Commitments.

Should you have any questions regarding this submittal, please contact Cecil Fletcher at (803) 701-3622.

I declare under penalty of perjury that the foregoing is true and correct. Executed on August 26, 2015.

Sincerely,



Kelvin Henderson
Vice President, Catawba Nuclear Station

Enclosure:

Fifth Six-Month Status Report Response (Order EA-12-049), Catawba Nuclear Station (CNS), Units 1 and 2, Docket Nos. 50-413 and 50-414, Renewed License Nos. NPF-35 and NPF-52

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ENCLOSURE

FIFTH SIX MONTH STATUS REPORT (ORDER EA-12-049)

CATAWBA NUCLEAR STATION (CNS), UNITS 1 AND 2

DOCKET NOS. 50-413 AND 50-414

RENEWED LICENSE NOS. NPF-35 AND NPF-52

1 Introduction

Catawba Nuclear Station (CNS) developed an Overall Integrated Plan (Reference 1 in Section 8), documenting the diverse and flexible strategies (FLEX), in response to NRC Order EA-12-049 (Reference 2 in Section 8). The Overall Integrated Plan (OIP) was submitted to the NRC on February 28, 2013. This enclosure provides an update of milestone accomplishments including any changes to the compliance method, schedule, or need for relief/relaxation and the basis, if any, that occurred during the period from January 28, 2015 to July 29, 2015 to (hereafter referred to as "the update period").

2 Milestone Accomplishments

The following milestones were completed during the update period:

- 1) Fourth Six-Month Status Report for Catawba Nuclear Station, Units 1 and 2 was submitted on February 26, 2015.
- 2) Unit 2 EC Implementation (2EOC20).
- 3) SAFER National Response Centers Operational.

3 Milestone Schedule Status

The following provides an update to Attachment 2 of the Overall Integrated Plan. It provides the activity status of each item, and whether the expected completion date has changed from that stated in Attachment 2 of the OIP. The dates are planning dates subject to change as design and implementation details are developed.

The revised milestone target completion dates are not expected to impact the order implementation date.

| Milestone | Target Completion Date | Activity Status | Revised Target Completion Date |
|-------------------------------------|-------------------------------|------------------------|---------------------------------------|
| Submit 60 Day Initial Status Report | Oct 2012 | Complete | Date Not Revised |
| Submit Overall Integrated Plan | Feb 2013 | Complete | Date Not Revised |
| First 6 Month Status Update | Aug 2013 | Complete | Date Not Revised |
| Second 6 Month Status Update | Feb 2014 | Complete | Date Not Revised |
| Third 6 Month Status Update | Aug 2014 | Complete | Date Not Revised |

| Milestone | Target Completion Date | Activity Status | Revised Target Completion Date |
|---|-------------------------------|------------------------|---------------------------------------|
| Fourth 6 Month Status Update | Feb 2015 | Complete | Date Not Revised |
| Develop Engineering Changes (ECs) | Jul 2015 | Complete | Date Revised |
| Develop Strategies | Sep 2015 | Started | Date Revised |
| Purchase Equipment | Oct 2015 | Started | Date Revised |
| Develop Equipment PMs | Oct 2015 | Started | Date Revised |
| Develop Guidelines | Feb 2015 (U2) | Started | Date Not Revised |
| | Oct 2015 (U1) | | |
| Develop Training | Sep 2015 | Started | Date Revised |
| Implement Training | Oct 2015 | Started | Date Revised |
| Staffing 12-01 Phase II | Nov 2014 | Complete | Date Not Revised |
| Communications Integrated Plan | May 2015 | Complete | Date Not Revised |
| EC Implementation (On-Line) | Oct 2015 | Started | Date Revised |
| Unit 1 EC Implementation (1EOC22) | Dec 2015 | Not Started | Date Not Revised |
| Unit 2 EC Implementation (2EOC20) | Mar 2015 | Complete | Date Not Revised |
| Site Implementation Complete | Dec 2015 | Not Started | Date Not Revised |
| SAFER National Response Centers Operational | Feb 2015 | Complete | Date Not Revised |

4 Changes to Compliance Method

The following summarizes the changes to the compliance method or strategies as documented in the Overall Integrated Plan (Reference 1 in Section 8) or previous 6 Month Updates (References 3, 4, 5, and 6 in Section 8). These changes do not impact Catawba Nuclear Stations compliance with NEI 12-06.

- 1) Change: Some of the Deployment Conceptual Design and Deployment Conceptual Modification sections in the OIP only make reference to the National SAFER Response Center (NSRC) located in Memphis Tennessee. There are actually two NSRCs that can supply Phase 3 resources to Catawba, the NSRC-M for the Memphis location and NSRC-P for the Phoenix location.

Justification: The final approved SAFER Response Plan for Catawba lists both the Memphis and Phoenix NSRC locations as available Phase 3 resources.

Documentation: Reference SAFER Response Plan for Catawba Nuclear Station, Rev. 2 dated 2/10/15.

- 2) Change: Page 56 of 94 in the OIP states the following: *Portable fans that are intrinsically safe (explosion proof) will be placed in vital battery rooms when the batteries are being charged to ensure hydrogen accumulation does not exceed flammability limits. Current air flow from the battery rooms is around 110 cfm and each 8 inch FLEX fan is capable of moving approximately 600 cfm of air.* The new strategy will place a single fan in the stairwell doorway on the Unit 2 side of the vital battery rooms and open additional doors/pathways to ensure the temperature and hydrogen concentration in the vital battery rooms and adjacent area remain within acceptable limits.

3)

Justification: An HVAC/Gothic analysis performed by Zachry confirms that the ventilation strategy described above for the vital battery rooms and adjacent area is viable.

Documentation: Reference CNC-1211.00-00-0146 Rev. 0 (Gothic Analysis for Extended Loss of All AC Power (ELAP/FLEX)).

- 4) Change: The PWR Portable Equipment Phase 2 table on Page 64 of 94 in the OIP only lists 2.5", 5", and 6" Fire Hose. The current mitigation strategies also make use of 3" Fire Hose. The table also lists (3) 12 Volt DC Fuel Transfer Pumps which were part of the original equipment purchase but are not credited in any strategies.

Justification: Use of 3" Fire Hose for many of the mitigation strategies was more economical and manpower friendly than using larger diameter hose. Flow modeling verified that use of 3" Fire Hose was acceptable for the different strategies that use this size hose. A diesel driven fuel transfer pump mounted on a trailer with a 500 gallon tank was chosen as the method to transfer diesel fuel between safety related underground storage tanks and the various pieces of Flex equipment. As such, the 12 Volt DC Fuel Transfer Pumps are no longer required.

Documentation: Reference calculations CNC-1223.02-00-0025 (Flow Model of SNSWP to CA Connections Phase 2 FLEX Strategies), CNC-1223.02-00-0028 (Flow Model for U2 NI Portable Pump Injection to RCS Phase 2 & 3 FLEX Strategies), and the various Flex Support Guidelines (FSGs).

- 5) Change: The sketch of the Portable Pump Location at Ultimate Heat Sink on Page 78 of 94 in the OIP has been revised based on a change in the design.

Justification: The design of the Standby Nuclear Service Water Pond (SNSWP, aka Ultimate Heat Sink) Portable Pump access structure was revised from a sea wall type design to a boat ramp type design. The revised sketch shows the final as built configuration.

Documentation: Reference EC110731.

- 6) Change: Change No. 8 in the Fourth Six Month Update to the OIP stated the following: *Per discussion with CNS and MNS Engineering, Safety Analysis, Westinghouse, and MPR it was determined that a new pressure breakdown orifice will be required in each of the Reactor Coolant Pump (RCP) No.1 seal leak off lines, upstream of the existing flow orifice. Westinghouse has conservatively provided an assumed worst case pressure of 2045 psia at the No.1 seal outlet following an Extended Loss of All AC Power (ELAP) event. The new pressure breakdown orifice is needed to prevent damage/degradation to the existing flow orifice because of excessive delta P. Additional piping stress and support analysis will also be performed once the new temperature/pressure profile is determined to ensure all of the associated seal leak off line components retain their pressure boundary function.* The actual Engineering Change to resolve this issue did not install a new pressure breakdown orifice. Instead, the existing flow element orifice plate was replaced with one having a thicker profile that could withstand the 2045 psia pressure requirement.

Justification: All of the analyses related to an ELAP assume the leak rate from the RCP No. 1 seal is 21 gpm or less. To ensure this assumption remains valid, a more robust flow element orifice plate is being installed in the RCP No. 1 seal leak off line for each pump. The thicker orifice plate has been verified via analysis to remain intact and have insignificant deformation under the higher assumed pressure requirement of 2045 psia. Thermal Hydraulic, piping, and support analyses have also been performed at this higher pressure to verify that components downstream of the RCP No. 1 seal leak off outlet connection do not fail and create the possibility for leak rates greater than 21 gpm.

Documentation: Open Item 96 and ECs 114658 (Unit 2) and 115165 (Unit 1).

5 Need for Relief/Relaxation and Basis for the Relief/Relaxation

CNS expects to comply with the order implementation date and no relief/relaxation is required at this time.

6. Open Items

The following tables provide a summary status of the Open Items. The table under Section 6.a. provides the Open Items identified in Attachment 5 of the original OIP submitted on February 28, 2013 and in the first, second, third, and fourth six month status reports (References 1, 3, 4, 5 and 6 in Section 8). The table under Section 6.b. provides a list of Open Items that were added after January 28, 2015. The table under 6.c. provides a list of Open Items related to the Interim Staff Evaluation (ISE). The table under 6.d. provides a list of Confirmatory Items related to the Interim Staff Evaluation (ISE).

- a. Open Items Documented in the Overall Integrated Plan, the First Six Month Status Report, the Second Six Month Status Report, the Third Six Month Status Report, and the Fourth Six Month Status Report.

| Item | Overall Integrated Plan Open Item | Status |
|------|---|----------|
| 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 C-12-2291. | Complete |
| 2 | Provide pumping capacity to control level in TDAFWP pit sump. Additional analysis required to verify adequate pump head exists to overcome potential Turbine Building flooding. See Corrective Action 26 in PIP C-12-2291. | Complete |
| 3 | Provide pumping capacity to control level in TDAFWP pit sump. Activity to be validated in conjunction with associated procedure changes. See Corrective Action 27 in PIP C-12-2291. | Started |
| 4 | Recharge communication system and satellite phone system. Activity to be validated in conjunction with associated procedure changes. See Corrective Action 28 in PIP C-12-2291. | Complete |
| 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. | Started |
| 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. | Complete |
| 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. | Started |
| 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. | Started |

| Item | Overall Integrated Plan Open Item | Status |
|------|--|----------|
| 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. | Complete |
| 10 | Install portable fans in Control Room and battery rooms. Activity to be validated in conjunction with associated procedure changes. See Corrective Action 34 in PIP C-12-2291. | Started |
| 11 | Connect diesel driven Hale Pump through Essential Service Water piping to Spent Fuel Pool skimmer loop to provide a means to make up to the SFP without entering the SFP area. Activity to be validated in conjunction with associated procedure changes. See Corrective Action 35 in PIP C-12-2291. | Started |
| 12 | Open Spent Fuel Pool bay doors. Activity to be validated in conjunction with associated procedure changes. See Corrective Action 36 in PIP C-12-2291. | Started |
| 13 | Align diesel driven Hale Pump to supply Essential Service Water supply header from UHS. Activity to be validated in conjunction with associated procedure changes. See Corrective Action 37 in PIP C-12-2291. | Started |
| 14 | Align diesel driven Hale Pump to supply second diesel driven Hale Pump to feed SGs. Activity to be validated in conjunction with associated procedure changes. See Corrective Action 38 in PIP C-12-2291. | Started |
| 15 | Re-power H2 igniters. Activity to be validated in conjunction with associated procedure changes. See Corrective Action 39 in PIP C-12-2291. | Started |
| 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. | Started |
| 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. | Started |
| 18 | Evaluate need to provide freeze protection for instrumentation located in Doghouses and yard. 48 hours is based on engineering judgment. Evaluation will be performed to determine actual action time. See Corrective Action 42 in PIP C-12-2291. | Complete |
| 19 | Evaluate need to provide freeze protection for instrumentation located in Doghouses and yard. Activity to be validated in conjunction with associated procedure changes. See Corrective Action 43 in PIP C-12-2291. | Complete |
| 20 | Isolate Instrument Air to Containment. Activity to be validated in conjunction with associated procedure changes. See Corrective Action 44 in PIP C-12-2291. | Started |

| Item | Overall Integrated Plan Open Item | Status |
|------|--|----------|
| 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. | Complete |
| 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. | Complete |
| 23 | Arrangements with local transportation businesses and Regional Response Centers will need to be established to ensure personnel and equipment can reach the site considering extensive damage to surrounding infrastructure (roads, bridges, etc.). See Corrective Action 47 in PIP C-12-2291. | Complete |
| 24 | Additional sump pumps need to be specified, purchased, and placed in critical rooms and floor elevations in the Auxiliary building to mitigate/control internal flooding. See Corrective Action 48 in PIP C-12-2291. | Complete |
| 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. | Started |
| 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. | Started |
| 27 | A site specific Building Specification will be written that details the storage facility design requirements and ECR 5979 will design and construct the facilities. See Corrective Action 12 in PIP C-12-2291. | Complete |
| 28 | Add appropriate FLEX equipment to the site Periodic Maintenance (PM) program. See Corrective Action 50 in PIP C-12-2291. | Complete |
| 29 | Develop a Document for the FLEX program. See Corrective Action 51 in PIP C-12-2291. | Complete |
| 30 | Determine if Engineering Change program documents or checklists need to be revised to include verification that the modification does not impact the FLEX program. See Corrective Action 52 in PIP C-12-2291. | Complete |
| 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. | Started |

| Item | Overall Integrated Plan Open Item | Status |
|------|--|----------|
| 32 | Develop flow model calculations to support the various FLEX strategies and document the available static water volume in RN/CA piping. See Corrective Action 20 in PIP C-12-2291. | Complete |
| 33 | Provide RN supply header hose connections in the yard and in the pumphouse for portable pump to fill/pressurize RN system - ECR 5976 and 5977. See Corrective Action 9 and 10 in PIP C-12-2291. | Complete |
| 34 | Provide primary CA piping connections for S/G Makeup via portable pump (ECR 5980 and 5981). See Corrective Action 13 and 14 in PIP C-12-2291. | Started |
| 35 | Provide MCC cable plug in connections for various loads (ECR 6047 and 6048). See Corrective Action 75 and 76 in PIP C-12-2291. | Started |
| 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. | Started |
| 37 | Purchase high pressure and low pressure RCS injection pumps. See Corrective Action 54 in PIP C-12-2291. | Complete |
| 38 | Provide seismically qualified connection on the FD piping to access diesel fuel in safety related underground storage tanks (ECR 5985 and 5988). See Corrective Action 17 and 18 in PIP C-12-2291. | Complete |
| 39 | Purchase portable diesel fuel transfer pump and storage tank. See Corrective Action 55 in PIP C-12-2291. | Complete |
| 40 | Provide access road to the SNSWP for the portable diesel pump (ECR 5978). See Corrective Action 11 in PIP C-12-2291. | Complete |
| 41 | An analysis is needed to determine whether or not venting/letdown is required when providing borated water injection. See Corrective Action 56 in PIP C-12-2291. | Complete |
| 42 | An analysis is needed to determine if containment spray for temperature/pressure control is not required over the long term. See Corrective Action 57 in PIP C-12-2291. | Complete |
| 43 | Provide redundant SFP Level Instruments per NRC Order - EC109413 and 109414. See Corrective Action 4 and 5 in PIP C-12-2205. | Started |
| 44 | Determine lighting requirements via Corrective Action 31 in PIP C-11-6867. | Complete |
| 45 | Determine lighting requirements and implement as needed via Corrective Action 24 in PIP C-12-2291. | Complete |
| 46 | Determine long term environmental conditions in the Control Room and CA Pump room via Corrective Action 13 in PIP C-11-6867. This evaluation will be part of Corrective Action 33 in PIP C-12-2291. | Complete |
| 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. | Complete |

| Item | Overall Integrated Plan Open Item | Status |
|------|---|----------|
| 48 | Evaluate and purchase, if necessary, additional portable radios, spare batteries, and chargers to ensure required communications links are fully established. Corrective Action 8 in PIP C-12-2195. | Complete |
| 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. | Complete |
| 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. | Complete |
| 51 | Ensure that arrangements are in place with communications service providers to utilize their emergency services as described in NEI 12-01, Section 4.10. Corrective Action 12 in PIP C-12-2195. | Complete |
| 52 | Purchase debris removal equipment that is also capable of towing all FLEX equipment. See Corrective Action 58 in PIP C-12-2291. | Complete |
| 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. | Complete |
| 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. | Complete |
| 55 | Develop Regional Response Center Playbook. See Corrective Action 61 in PIP C-12-2291. | Complete |
| 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. | Complete |
| 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. | Started |
| 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. | Started |
| 59 | Develop procedural guidelines to deploy and install lighting in required areas. See Corrective Action 24 and 32 in PIP C-12-2291. | Started |

| Item | Overall Integrated Plan Open Item | Status |
|------|--|----------|
| 60 | Determine if Phase 3 ventilation needs (RRC equipment, additional procedural guidelines, etc.) are required. See Corrective Action 64 in PIP C-12-2291. | Complete |
| 61 | Determine if Mobile Boration will be required from the RRC during Phase 3. See Corrective Action 65 in PIP C-12-2291. | Complete |
| 62 | Determine if portable lighting will be required from the RRC during Phase 3. See Corrective Action 66 in PIP C-12-2291. | Complete |
| 63 | Determine if portable fans/ducting will be required from the RRC during Phase 3. See Corrective Action 67 in PIP C-12-2291. | Complete |
| 64 | Determine Phase 3 requirements related to Radiation Protection Equipment. See Corrective Action 68 in PIP C-12-2291. | Complete |
| 65 | Determine Phase 3 requirements related to Commodities such as food and water. See Corrective Action 69 in PIP C-12-2291. | Complete |
| 66 | Calculate diesel fuel consumption rates for the portable FLEX equipment and compare that to the available fuel stored in the Emergency Diesel Generator safety related underground storage tanks to determine if additional diesel fuel is needed from off-site resources during Phase 3. See Corrective Action 70 in PIP C-12-2291. | Complete |
| 67 | Select and purchase Phase 3 debris clearing equipment and/or transport vehicles if needed to move RRC equipment around the site. See Corrective Action 71 in PIP C-12-2291. | Complete |
| 68 | Implement Flood mitigation activities per Corrective Action Program (Ref. PIP C-12-0833). | Started |
| 69 | Complete initial testing of FLEX mitigation equipment prior to full implementation dates. See Corrective Action 72 in PIP C-12-2291. | Complete |
| 70 | Establish a Special Emphasis Code in the EDB and Work Control program for FLEX equipment. See Corrective Action 73 in PIP C-12-2291. | Complete |
| 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. | Started |
| 72 | Revise RP/0/A/5000/007 (Natural Disaster and Earthquake) to move equipment at the SNSWP if flooding is imminent. See Corrective Action 79 in PIP C-12-2291. | Complete |
| 73 | Formally evaluate/document potential deployment route concerns such as soil liquefaction discussed in NEI 12-06. See Corrective Action 86 in PIP C-12-2291. | Complete |
| 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. | Complete |
| 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) | Complete |

| Item | Overall Integrated Plan Open Item | Status |
|------|--|----------|
| 76 | Evaluate travel paths into the Auxiliary Building through non seismic structures. See Corrective Action 88 in PIP C-12-2291. | Complete |
| 77 | An analysis is needed to determine if there are any impacts to FLEX strategies due to large internal flooding sources that are not seismically robust or that require AC power for isolation. The analysis shall also consider the effects of ground water intrusion during an Extended Loss of All AC Power event. See Corrective Action 89 in PIP C-12-2291. | Complete |
| 78 | A Catawba specific shutdown margin calculation performed in accordance with PWROG guidance is required. See Corrective Action 90 in PIP C-12-2291. | Complete |
| 79 | Westinghouse assistance is required to provide additional information related to seal leakage on the Catawba Reactor Coolant Pumps. See Corrective Action 91 in PIP C-12-2291. | Complete |
| 80 | The number of Steam Generators and 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. | Complete |
| 81 | Westinghouse assistance is needed to perform thermal hydraulic analyses to support plant specific decision making and provide justification for the duration of each phase. See Corrective Action 93 in PIP C-12-2291. | Complete |
| 82 | Additional analyses is needed to evaluate whether containment penetration seals and other equipment located inside containment and used in the mitigation strategies are still functional based on the predicted temperatures and pressures during a Fukushima type event. See Corrective Action 94 in PIP C-12-2291. | Complete |
| 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. | Started |
| 84 | Determine if any changes to WPM 602, NSD 403, or any other site/fleet Shutdown/Refueling documents need to be revised to comply with the position paper related to Shutdown Risk Management and Contingency Planning. See Corrective Action 96 in PIP C-12-2291. | Complete |
| 85 | Perform a seismic robustness evaluation of the proposed cable "backbone" and it's associated components. See Corrective Action 97 in PIP C-12-2291. | Started |
| 86 | Vendor data and system calculations needed to support FLEX response strategies involving low speed operation of Turbine-Driven CA (TDCA) Pumps in support of ELAP EOP setpoint O.12 development. See Corrective Action 1 in PIP C-13-9158. | Complete |

| Item | Overall Integrated Plan Open Item | Status |
|------|--|----------|
| 87 | Due to normal operational input to the TDCA pump pit sump and having both TDCA pumps in simultaneous operation, additional portable sump pumps, hoses, and associated equipment are required. See Corrective Action 15 in PIP C-11-6867. | Complete |
| 88 | A calculation is needed to support the validation of the Fukushima Phase 3 strategy associated with providing core cooling via the portable pump feeding RN from the SNSWP, powering up one KC pump and one ND pump via the 4160 Volt portable generator from the Regional Response Center. The calculation should determine whether or not adequate core cooling can be achieved with reduced RN flow rates assuming worst case SNSWP upper temperature limits and core decay heat loads when this Phase 3 strategy is put in service. See Corrective Action 98 in PIP C-12-2291. | Complete |
| 89 | As documented in Actual Corrective Action #8 in PIP C-12-2291, EC110650 (Install New Fire Hydrant Near The SNSWP For Flex Buildings & B.5.B) is to be cancelled. Complete actions to finalize cancellation of this Engineering See Corrective Action 101 in PIP C-12-2291. | Complete |
| 90 | Ensure that hard copies of Procedures needed to support EP and AP implementation (and any additional supporting procedures identified by FLEX procedures) are accessible during a BDBEE causing an Extended Loss of All AC Power (ELAP greater than 4 hrs.). See Corrective Action 102 and 120 in PIP C-12-2291. | Complete |
| 91 | Review DPC-1552.08-00-0278, Appendix C. Determine which operations procedures perform surveillances of the CLAs boron concentrations. Make the necessary revisions using the basis provided by DPC-1552.08-00-0278, Appendix C. See Corrective Action 104 in PIP C-12-2291. | Complete |
| 92 | Review DPC-1552.08-00-0278, Appendix C. Determine which chemistry procedures perform surveillances of the CLAs boron concentrations. Make the necessary revisions using the basis provided by DPC-1552.08-00-0278, Appendix C. See Corrective Action 105 and 121 in PIP C-12-2291. | Complete |
| 93 | Portions of the Flex equipment deployment paths will traverse under existing power/transmission lines located on site. As such, guidance needs to be developed and placed in procedures (FSG's) on how to use the deployment path if power/transmission lines and/or towers have fallen across the path. An evaluation on the impact to deployment and mitigation strategy timelines also needs to be documented. See Corrective Action 106 in PIP C-12-2291. | Complete |

| Item | Overall Integrated Plan Open Item | Status |
|------|--|----------|
| 94 | NRC Audit question #44 asks about containment pressures during an ELAP event. Based on the Rev. 2 draft of DPC-1552.08-00-0280 (Extended Loss of AC Power (ELAP) – Ice Condenser Containment Response with FLEX Mitigation Strategies), containment pressures for Catawba Units 1 and 2 will exceed design pressures. Justification for operating above containment design pressures during an ELAP event needs to be addressed by engineering. See Corrective Action 119 in PIP C-12-2291. | Complete |
| 95 | Section 1.4 in Attachment 1 of DPC-1552.08-00-0280 Rev. 2 provides Catawba specific Containment Acceptance Criteria. Based on results in Rev. 2 of DPC-1552.08-00-0280, the following Acceptance Criteria item could be exceeded for a short period of time: 1.4.2 Recovery to less than 212°F in the containment cubicles (i.e., SGs and Pzr) prior to RHR operation is desired, but not necessary. This Corrective Action should justify exceeding this Acceptance Criteria limit. See Corrective Action 122 in PIP C-12-2291. | Complete |
| 96 | A new pressure breakdown orifice will be required in each of the Reactor Coolant Pump (RCP) No.1 seal leak off lines upstream of the existing flow orifice (Ref. ECR 8527). See Corrective Action 1 in PIP C-15-355. | Started |

b. Open Items added after January 28, 2015.

| Item | Overall Integrated Plan Open Item | Status |
|------|---|----------|
| 97 | A process needs to be in place to monitor S/G deposition to ensure compliance with the Westinghouse Water Quality Analysis. See Corrective Action 123 in PIP C-12-2291. | Complete |
| 98 | Designate a SAFER Response Plan SPOC position and update NSD 117. See Corrective Action 125 in PIP C-12-2291. | Complete |
| 99 | Generate additional EDB records for Flex equipment. See Corrective Action 126 in PIP C-12-2291. | Complete |
| 100 | Issue CNM 1203.03-0269.001 (new number assignment for this work) that assembles the operation and maintenance instruction manual for the Hale 3000 FLEX Pumps. See Corrective Action 127 in PIP C-12-2291. | Complete |
| 101 | Conduct a validation of the FLEX strategies in accordance with the NEI FLEX Validation Process. See Corrective Action 128 in PIP C-12-2291. | Complete |
| 102 | This action is for the Nuclear Procedures Group to complete various OP procedures for the Unit 2 Fukushima Project to support the Unit 2 Validation and Verification. See Corrective Action 129 in PIP C-12-2291. | Complete |

| Item | Overall Integrated Plan Open Item | Status |
|------|---|----------|
| 103 | This action is for the Operations Support Group to complete the Fukushima FLEX Procedures. See Corrective Action 130 in PIP C-12-2291. | Complete |
| 104 | This Corrective Action is to verify that the SAFER Response Plan for Catawba Nuclear Station is incorporated into an Administrative Procedure with the number CNSRP-1612.03-01. See Corrective Action 132 in PIP C-12-2291. | Complete |
| 105 | Add a step to the Unit 2 Controlling Procedure for Unit Shutdown stating that "Prior to entering Loops Not Filled, ensure FLEX equipment is pre-staged as required for shutdown conditions." See Corrective Action 130 in PIP C-12-2291. | Complete |
| 106 | Track and document FSGs and other procedures needed for the Unit 1 FLEX order implementation. See Corrective Action 136 in PIP C-12-2291. | Started |
| 107 | OPT LOR supervisor to ensure all licensed operators have received training on specified Lesson Plans. See Corrective Action 140 in PIP C-12-2291. | Complete |
| 108 | OPT AO supervisor to ensure all Auxiliary Operators have received training on specified Lesson Plans/FAM. Guides. See Corrective Action 141 in PIP C-12-2291. | Complete |
| 109 | ILT supervisor to ensure all ILT15 candidates receive training on specified Lesson Plans. See Corrective Action 142 in PIP C-12-2291. | Complete |
| 110 | ILT supervisor to ensure all ILT16 candidates receive training on specified Lesson Plans. See Corrective Action 143 in PIP C-12-2291. | Complete |
| 111 | Perform and document the Unit 1 flow modeling calculations associated with the validation of the Fukushima mitigation strategies. See Corrective Action 145 in PIP C-12-2291. | Started |
| 112 | Ensure that hard copies of Procedures needed to support Unit 1 EP and AP implementation (and any additional supporting procedures identified by FLEX procedures) are accessible during a BDBE causing an extended loss of all AC power (greater than 4 hrs.). See Corrective Action 146 in PIP C-12-2291. | Started |
| 113 | This action is for transmitting the Initial Issue of Specification CNS-1465.00-00-0022 Revision 0, Design Basis Specification for the "FLEX Program for NRC Order EA-12-049". See Corrective Action 147 in PIP C-12-2291. | Complete |

| Item | Overall Integrated Plan Open Item | Status |
|------|---|---------|
| 114 | Calculation CNC-1223.02-00-0028, Rev. 1, for the NI system flow model for FLEX has determined a recommended change to FLEX procedures FSG-08 for U1 and U2. See Corrective Action 150 in PIP C-12-2291. | Started |
| 115 | Issue CNM 1203.03-0270.001 (new number assignment for this work) that assembles the operation and maintenance instruction manual for the Hale Medium Pressure FLEX Pumps (Model: HP300/450DJ-TC). See Corrective Action 151 in PIP C-12-2291. | Started |
| 116 | Issue CNM 1203.03-0271.001 (new number assignment for this work) that assembles the operation and maintenance instruction manual for the Hale High Pressure FLEX Pumps (Model: HP40/1700DJ-TC). See Corrective Action 152 in PIP C-12-2291. | Started |

c. Interim Staff Evaluation Open Items (Item Number is associated with the section of the Technical Evaluation Report performed by Mega-Tech Services, LLC for the NRC)

| Item | Interim Staff Evaluation Open Item | Status |
|-----------|--|-------------------------------------|
| 3.1.2.2.A | Resolve the conflict between the need to pump the TDAFW pump pit before submergence at 6 hours and deploying generators to power the sump pumps by 8 hours. See Corrective Action 107 in PIP C-12-2291. | Complete (Ref. NRC SE Tracker List) |
| 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. See Corrective Action 108 in PIP C-12-2291. | Complete (Ref. DPC-1552.08-00-0278) |

d. Interim Staff Evaluation Confirmatory Items (Item Number is associated with the section of the Technical Evaluation Report performed by Mega-Tech Services, LLC for the NRC)

| Item | Interim Staff Evaluation Confirmatory Item | Status |
|-----------|--|-------------------------------------|
| 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. See Corrective Action 109 in PIP C-12-2291. | Complete (Ref. NRC SE Tracker List) |
| 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. See Corrective Action 110 in PIP C-12-2291. | Open |

| Item | Interim Staff Evaluation Confirmatory Item | Status |
|-----------|---|-------------------------------------|
| 3.2.1.1.A | 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. Confirm that the NOTRUMP code is used within the accepted limits. See Corrective Action 111 in PIP C-12-2291. | Complete (Ref. NRC SE Tracker List) |
| 3.2.1.3.A | Westinghouse will be assisting CNS in providing further information regarding decay heat modeling. Evaluate for applicability and implementation. See Corrective Action 112 in PIP C-12-2291. | Complete (Ref. NRC SE Tracker List) |
| 3.2.3.A | Licensee will confirm that the final containment analysis validates that containment spray for temperature/pressure control is not required over the long term, or will provide procedures to cool the containment. See Corrective Action 113 in PIP C-12-2291. | Complete (Ref. NRC SE Tracker List) |
| 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. See Corrective Action 114 in PIP C-12-2291. | Open |
| 3.2.4.3.A | Evaluations to address the needs for freeze protection are in progress. Confirm completion of evaluations and appropriate actions. See Corrective Action 115 in PIP C-12-2291. | Open |
| 3.2.4.4.A | Confirm evaluations for additional lighting have been completed (licensee's open item 45 and 59), and appropriate actions taken. See Corrective Action 116 in PIP C-12-2291. | Open |
| 3.2.4.4.B | Confirm upgrades to the site's communication systems have been completed. See Corrective Action 117 in PIP C-12-2291. | Complete (Ref. NRC SE Tracker List) |
| 3.4.A | Offsite Resources- Confirm NEI 12-06 Section 12.2, Guidelines 2 through 10, are addressed with SAFER. See Corrective Action 118 in PIP C-12-2291. | Open |

7 Potential Interim Staff Evaluation Impacts

There are no potential impacts to the Interim Staff Evaluation identified at this time.

8 References

The following references support the updates to the Overall Integrated Plan described in this attachment.

- 1) Catawba Nuclear Station, Unit Nos. 1 and 2, Overall Integrated Plan in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049), dated February 28, 2013.

CNS Fifth Sixth Month Status Report (Order EA-12-049)

- 2) NRC Order Number EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," dated March 12, 2013.
- 3) First Six-Month Status Report (Order EA-12-049), Catawba Nuclear Station (CNS), Units 1 and 2, Docket Nos. 50-413 and 50-414, Renewed License Nos. NPF-35 and NPF-52.
- 4) Second Six-Month Status Report (Order EA-12-049), Catawba Nuclear Station (CNS), Units 1 and 2, Docket Nos. 50-413 and 50-414, Renewed License Nos. NPF-35 and NPF-52.
- 5) Third Six-Month Status Report (Order EA-12-049), Catawba Nuclear Station (CNS), Units 1 and 2, Docket Nos. 50-413 and 50-414, Renewed License Nos. NPF-35 and NPF-52.
- 6) Fourth Six-Month Status Report (Order EA-12-049), Catawba Nuclear Station (CNS), Units 1 and 2, Docket Nos. 50-413 and 50-414, Renewed License Nos. NPF-35 and NPF-52.
- 7) NRC Interim Staff Guidance 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, dated August 29, 2012, 2012 (ADAMS Accession No. ML12229A174).
- 8) NEI 12-06, Diverse and Flexible Coping Strategies (FLEX) Implementation Guide, Revision 0, dated August 2012
- 9) Duke Energy's Initial Status Report in Response to March 12, 2012, Commission Order Modifying Licenses with Regard To Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order EA-12-049), dated October 29, 2012, (ADAMS Accession No. ML12307A023).
- 10) Catawba Nuclear Station, Units 1 and 2 -Interim Staff Evaluation Relating To Overall Integrated Plan In Response To Order EA-12-049 (Mitigation Strategies) (Tac Nos. Mf1162 and Mf1163), Dated February 6, 2014 (ADAMS Accession No. ML13364A173).
- 11) NRC letter from Jack R. Davis, Director Mitigating Strategies Directorate Office of Nuclear Reactor Regulation, to Nuclear Energy Institute, Mr. Joseph E. Pollock, Vice President Nuclear Operations, dated September 30, 2013, (ADAMS Accession No. ML13267A382).

- 12) NRC letter from Jack R. Davis, Director Mitigating Strategies Directorate Office of Nuclear Reactor Regulation, to Jack Stringfellow, PWROG PWR Owners Group, Program Management Office Westinghouse Electric Company LLC, October 7, 2013, (ADAMS Accession No. ML13276A555).
- 13) NRC letter from Jack R. Davis, Director Mitigating Strategies Directorate Office of Nuclear Reactor Regulation, to Jack Stringfellow, PWROG PWR Owners Group, Program Management Office Westinghouse Electric Company LLC, dated January 8, 2014, (ADAMS Accession No. ML13276A183).
- 14) NRC letter from Jack R. Davis, Director Mitigating Strategies Directorate Office of Nuclear Reactor Regulation, to Nuclear Energy Institute, Mr. Joseph E. Pollock, Vice President Nuclear Operations, dated October 3, 2013, (ADAMS Accession No. ML13275A318).
- 15) NRC letter from Jack R. Davis, Director Mitigating Strategies Directorate Office of Nuclear Reactor Regulation, to Nuclear Energy Institute, Mr. Joseph E. Pollock, Vice President Nuclear Operations, dated September 16, 2013, (ADAMS Accession Nos.: (Pkg.) ML13241A182, (NEI) ML13241A186, (Rsp.) ML13241A188).
- 16) NRC letter from Jack R. Davis, Director Mitigating Strategies Directorate Office of Nuclear Reactor Regulation, to Nuclear Energy Institute, Mr. Joseph E. Pollock, Vice President Nuclear Operations, dated October 7, 2013, (ADAMS Accession No.: ML13276A224).

