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CNS-15-008

10 CFR 50.4

February 26, 2015

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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: Fourth 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 (ADAMS Accession No. ML13066A173).

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

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February 26, 2015

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.

The purpose of this letter is to provide the fourth 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 Phil Barrett at (803) 701-4138.

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

Sincerely,

A handwritten signature in black ink, appearing to read 'K. Henderson', written in a cursive style.

Kelvin Henderson
Vice President, Catawba Nuclear Station

Enclosure:

Fourth Six-Month Status Report in 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

United States Regulatory Commission

Page 3

February 26, 2015

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ENCLOSURE

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

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 July 29, 2014 to January 28, 2015 (hereafter referred to as "the update period").

2 Milestone Accomplishments

The following milestones were completed during the update period:

- 1) Third Six-Month Status Report for Catawba Nuclear Station, Units 1 and 2 was submitted on August 28, 2014.
- 2) Phase II Staffing Study per NEI 12-01 submitted to the NRC on October 28, 2014.

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	Started	Date Not Revised
Develop Engineering Changes (ECs)	Jan 2015	Started	Date Revised
Develop Strategies	Feb 2015	Started	Date Revised
Purchase Equipment	Feb 2015	Started	Date Revised
Develop Equipment PMs	Feb 2015	Started	Date Revised
Develop Guidelines	Feb 2015 (U2) Oct 2015 (U1)	Started	Date Revised
Develop Training	Feb 2015	Started	Date Revised
Implement Training	May 2015	Started	Date Not Revised
Staffing 12-01 Phase II	Nov 2014	Complete	Date Not Revised
Communications Integrated Plan	May 2015	Started	Date Not Revised
EC Implementation (On-Line)	May 2015	Started	Date Not Revised
Unit 1 EC Implementation (1EOC22)	Dec 2015	Not Started	Date Revised
Unit 2 EC Implementation (2EOC20)	Mar 2015	Started	Date Revised
Site Implementation Complete	Dec 2015	Not Started	Date Not Revised
SAFER National Response Centers Operational	Feb 2015	Started	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, and 5 in Section 8). These changes do not impact Catawba Nuclear Stations compliance with NEI 12-06.

- 1) **Change:** All references to the Regional Response Center (RRC) in the OIP shall now be called the National SAFER Response Center (NSRC). Further designation can be NSRC-M for the Memphis location and NSRC-P for the Phoenix location.

Justification: Industry/Utility groups decided to rename the Regional Response Centers and all involved parties agreed upon the change.

Documentation: Reference 9/11/14 letter from Joseph E. Pollack, NEI, to Jack R. Davis, NRC/NRR regarding National SAFER Response Center Operational Status (ADAMS Accession No. ML14259A222) and White Paper on National SAFER Response Center (ADAMS Accession No. ML14259A223)

- 2) **Change:** Line Item 12 on Page 7 of 94 in the OIP states that a portable diesel driven pump should be aligned to the Nuclear Service Water (RN) system in 10 hours to provide long term makeup for the Spent Fuel Pool (SFP) and Steam Generators (S/Gs). Based on further analysis, it is not necessary to have the RN system filled and pressurized for at least 40 hours to support SFP makeup.

Justification: Based on the available water supply in the seismically robust Condenser Cooling Water (RC) system, the Turbine Driven Auxiliary Feedwater Pump can feed the S/Gs with the RC water source for at least 5 days on Unit 1 and for at least 8 days on Unit 2. RN makeup to the SFP is not required for 40 hours to maintain at least 10 feet of water above the top of the fuel assemblies based on worst case evaporation rates in the SFP.

Documentation: Reference Appendix L in Report No. 030321.13.01-001, Rev. 1 (Seismic Robustness Review Of Catawba Unit 1 Non-Safety Piping And Components For Diverse And Flexible Mitigation Strategies (Flex) dated January 2014, Westinghouse calculation CN-SEE-II-13-22 (Catawba Nuclear Station FLEX Alternate Cooling Evaluation Input Auxiliary Feedwater Usage) dated 7/23/14, and email from Darrell Davies to Jordan Penley dated 5/21/14 with subject line "RE: Catawba ELAP".

- 3) **Change:** Line Item 19 on Page 7 of 94 and the Phase 1 Containment discussion on Page 35 of 94 in the OIP states that containment pressure remains below design limits for at least 72 hours. The final containment analysis for Catawba determined that containment pressures actually exceed design pressure about 52 hours into the event (15 psig design and 17.5 psig at 52 hours).

Justification: An evaluation of the containment structure and associated penetrations was performed and it was determined that no significant issues exist when containment pressures reach 17.5 psig

Documentation: Open Item 94.

- 4) Change: Line Items 20 and 21 on Page 7 of 94, the Phase 2 Containment discussion starting on Page 37 of 94, the Phase 3 Containment discussion starting on Page 41 of 94, Action Item 26 and 27 on Page 71 of 94, Portable Pump Supply to Containment Spray Site Plan drawing on Page 81 of 94, Open Items 21 and 22 on Page 91 of 94, and Open Item 42 on Page 92 of 94 in the OIP all deal with using Containment Spray for temperature/pressure control. Containment Spray will no longer be used for pressure/temperature control based on the latest containment analysis.

Justification: Due to concerns with not having enough containment spray capabilities (flow rates and pressures from the portable pumps) to provide adequate pressure/temperature control and the fact that the containment spray water would add to flooding issues inside containment, a different containment pressure/temperature control strategy was developed. The new strategy makes use of the Hydrogen Skimmer, Containment Air Return, and Lower Containment ventilation fans to provide the necessary temperature and pressure controls until Residual Heat Removal strategies are put in service.

Documentation: Reference Rev. 2 of DPC-1552.08-00-0280 (Extended Loss of AC Power (ELAP) - Ice Condenser Containment Response with FLEX Mitigation Strategies).

- 5) Change: The last paragraph under Item 3 on Page 9 of 94 in the OIP states that the 50.54(hh)(2) (B.5.b) pump is credited in the FLEX mitigating strategies and that this pump will be moved into one of the new FLEX storage facilities that also meets all 50.54(hh)(2) requirements. The B.5.b pump is no longer being credited in the Flex mitigation strategies.

Justification: Additional pumps and equipment have been purchased to support all the requirements for the Flex mitigation strategies. As such, use of the B.5.b pump is no longer necessary.

Documentation: Reference Flex mitigation strategies in the Emergency Operating Procedures, Abnormal Operating Procedures, and Flex Support Guidelines. Open Items 37 and 53.

- 6) Change: There are a number of references to the RRC Playbook throughout the OIP (see Pages 3, 12, 23, and 92 of 94). This document is now referred to as the SAFER Response Plan for Catawba Nuclear Station.

Justification: Reference Rev. 001 of the SAFER Response Plan for Catawba Nuclear Station approved on 1/29/15.

Documentation: Open Item 55.

- 7) Change: The wording related to the Alternate Power Distribution strategy mentioned on Page 16 and 55 in the OIP needs to be clarified as follows: Wording on Page 16 and 55 should say "If normal power supplies are not available, they will be disconnected to allow connection of alternate supply cables. A quantity of alternate supply cables will be available to replace the Flex power supplies normally provided to a common plant area. If necessary, alternate supply cables can be connected at the portable diesel generator. Procedural guidelines will direct these activities (Open Item 58)".

Justification: The existing wording in the OIP for the Alternate Power Distribution strategy can be interpreted a number of different ways. As such, the wording has been revised to provide a little more clarification. Specific actions related to the Alternate Power strategy will be contained in the associated procedures.

Documentation: Open Item 58.

- 8) Change: 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.

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 new pressure breakdown orifice needs to be installed in the RCP No. 1 seal leak off line for each pump to lower pressures enough such that downstream components do not fail and create the possibility for leak rates greater than 21 gpm.

Documentation: Open Item 96.

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, and third six month status reports (References 1, 3, 4, and 5 in Section 8). The table under Section 6.b. provides a list of Open Items that were added after July 28, 2014. 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, and the Third 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.	Started
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.	Started
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.	Started
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.	Not Started
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.	Not Started
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.	Started
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.	Started
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.	Started
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.	Started
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.	Started
28	Add appropriate FLEX equipment to the site Periodic Maintenance (PM) program. See Corrective Action 50 in PIP C-12-2291.	Started
29	Develop a Document for the FLEX program. See Corrective Action 51 in PIP C-12-2291.	Started
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.	Started
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 the RN/CA piping (PIP C-12-2291 CA 20).	Started
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.	Started
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.	Started
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.	Started
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.	Started
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.	Started
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.	Started
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.	Started
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.	Started
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.	Started
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.	Started
55	Develop Regional Response Center Playbook. See Corrective Action 61 in PIP C-12-2291.	Started
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 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.	Started
61	Determine if Mobile Boration will be required from the RRC during Phase 3. See Corrective Action 65 in PIP C-12-2291.	Started
62	Determine if portable lighting will be required from the RRC during Phase 3. See Corrective Action 66 in PIP C-12-2291.	Started
63	Determine if portable fans/ducting will be required from the RRC during Phase 3. See Corrective Action 67 in PIP C-12-2291.	Started
64	Determine Phase 3 requirements related to Radiation Protection Equipment. See Corrective Action 68 in PIP C-12-2291.	Started
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.	Started
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.	Started
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.	Started
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.	Started
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)	Started

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.	Started
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.	Started
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.	Started
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.	Started
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.	Started
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.	Started
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.	Not 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.	Started
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.	Started

Item	Overall Integrated Plan Open Item	Status
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.	Started
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.	Started
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.	Started
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.	Started

b. Open Items added after July 28, 2014.

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.	Started
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

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
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.	Open
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.
- 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) 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).
- 7) NEI 12-06, Diverse and Flexible Coping Strategies (FLEX) Implementation Guide, Revision 0, dated August 2012
- 8) 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).
- 9) 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).
- 10) 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).
- 11) 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).

- 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, dated January 8, 2014, (ADAMS Accession No. ML13276A183).
- 13) 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).
- 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 September 16, 2013, (ADAMS Accession Nos.: (Pkg.) ML13241A182, (NEI) ML13241A186, (Rsp.) ML13241A188).
- 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 October 7, 2013, (ADAMS Accession No.: ML13276A224).