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CNS-14-086

10 CFR 50.4

August 28, 2014

ATTN: Document Control Desk  
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:** Third 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 First 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 August 28, 2013 (ADAMS Accession No. ML13298A010).
7. Catawba Second 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 28, 2014 (ADAMS Accession No. ML14065A038).

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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. References 6 and 7 provided the first and second six-month status report respectively for Catawba.

The purpose of this letter is to provide the third 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 August 28, 2014.

Sincerely,

A handwritten signature in black ink, appearing to read 'K. Henderson', written over a light blue horizontal line.

Kelvin Henderson  
Vice President, Catawba Nuclear Station

Enclosure:

Third 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

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**ENCLOSURE**

**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**

## 1 Introduction

Catawba Nuclear Station (CNS) developed an Overall Integrated Plan (Reference 1 in Section 7), documenting the diverse and flexible strategies (FLEX), in response to NRC Order EA-12-049 (Reference 2 in Section 7). 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, 2014 to July 28, 2014 (hereafter referred to as "the update period").

## 2 Milestone Accomplishments

The following milestones were completed during the update period:

- 1) Second Six-Month Status Report for Catawba Nuclear Station, Units 1 and 2 was submitted on February 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.

<b>Milestone</b>	<b>Target Completion Date</b>	<b>Activity Status</b>	<b>Revised Target Completion Date</b>
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	Started	Date Not Revised

<b>Milestone</b>	<b>Target Completion Date</b>	<b>Activity Status</b>	<b>Revised Target Completion Date</b>
Develop Engineering Changes (ECs)	Jan 2015	Started	Date Revised
Develop Strategies	Aug 2014	Started	Date Revised
Purchase Equipment	Oct 2014	Started	Date Revised
Develop Equipment PMs	Dec 2014	Started	Date Revised
Develop Guidelines	Sep 2014	Started	Date Revised
Develop Training	Dec 2014	Started	Date Revised
Implement Training	May 2015	Not Started	Date Not Revised
Staffing 12-01 Phase II	Nov 2014	Started	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	Not 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 (References 1 in Section 7) or previous 6 Month Updates (References 3 and 4 in Section 7). These changes do not impact Catawba Nuclear Stations compliance with NEI 12-06.

- 1) Change: Equipment listed in the PWR Portable Equipment Phase 3 table and the Phase 3 Response Equipment/Commodities table in the OIP are constantly changing based on equipment being purchased for Storage at the SAFER National Response Centers (SNRC) in Phoenix and Memphis based on availability and industry participation. As such, an updated list of Portable Phase 3 equipment available from the SNRC will be referenced to the latest revision of Areva's Regional Response Center Equipment Technical Requirements Document 51-9199717.

Justification: Equipment being provided by the SAFER National Response Centers for Phase 3 are evaluated by Catawba and Corporate Fukushima Response Organization personnel to ensure it can meet the requirements for applicable Phase 3 mitigation strategies.

Documentation: Areva's Regional Response Center Equipment Technical Requirements Document 51-9199717. Open Items 64, 65, 66, 67, 68, 69, 71, and 95.

- 2) Change: The OIP credited approximately 3 hours of Condenser Cooling Water system (RC) water and approximately 13 more hours of Nuclear Service Water system (RN) water as being available as a static suction source for the Turbine Driven Auxiliary Feedwater pump. It has been determined during seismic robustness evaluations, that approximately 48 hours of static RC water is available (per unit) to provide the suction supply requirements for the Turbine Driven Auxiliary Feedwater pump. As such, no credit will be taken for any static RN water volume.

Justification: A large static water volume is needed as a suction source for the Turbine Driven Auxiliary Feedwater pump that provides enough time to install portable equipment that can be used to fill and pressurize the RN system using water from the Standby Nuclear Service Water Pond (SNSWP). The 48 hours of RC system static water volume provides more than enough time to get the RN system filled and pressurized. Not crediting the static RN system water volume not only reduces seismic walkdown and seismic analysis scope significantly, it also reduces the need for scarce operations resources during the important initial incident response time. The amount of RN system static water volume available was also questionable due to seismic/non-seismic interfaces between RN and other systems.

Documentation: ARES Report No. 030321.13.01-001 Revision 1 (Seismic Robustness Review Of Catawba Unit 1 Non-Safety Piping and Components For Diverse and Flexible Mitigation Strategies (Flex). Open Item 32.

- 3) Change: Debris removal equipment will be stored in a single hardened structure that will house the other FLEX equipment.

Justification: Previous storage facility concepts assumed that CNS would utilize three spatially separated buildings. It has been decided that a single storage building will be constructed at CNS and all FLEX related equipment will be staged in this one facility. Having the debris removal equipment stored in a single hardened structure will provide assurance that the equipment is protected and available.

Documentation: Open Items 27 and 52.

- 4) Change: A single hardened FLEX storage building will be utilized. The building will be located West of the Catawba garage.

Justification: A Fleet decision was made to use a single hardened FLEX storage building at a number of Duke Energy nuclear sites, including Catawba, that uses a common design. The use of a single hardened structure provides less regulatory risk, consolidation of the FLEX equipment at a single location for better administrative control, less construction issues, and improved flood protection. The single building will meet the NEI 12-06 storage requirements for all hazards identified in NEI 12-06 that are applicable to the site.

Documentation: Open Item 27. Revised sketches for Equipment Deployment Route – Page 19 of this report, Portable Pump Supply to Essential Service Water Header / Storage Facility Locations – Page 20 of this report, and Portable Pump Supply to S/G's – Page 21 of this report.

- 5) Change: Attachment 1A in the OIP and the discussion of time constraints has charging of the A and D vital battery channels occurring at 8 hours and charging of the B and C vital battery channels occurring at 15 hours. The current strategies will begin charging the A, B, C, and D battery channels all at the same time which will be around 8 hours.

Justification: Setup of the portable Flex Phase 2 generators and powering the electrical distribution system will provide power for all four channels of vital batteries on each unit at essentially the same time. As such, there is no reason to delay charging the B and C vital battery channels. This will also provide conservative assumptions in the Hydrogen generation/ventilation analysis being performed by Zachry for the vital battery rooms and surrounding areas.

Documentation: Open Items 1, 5, 9, 10, 16.



- 6) Change: The OIP discussed having a FLEX storage building located near the Standby Nuclear Service Water Pond (SNSWP) and the need to move equipment stored in this building to higher ground during a flood event. This will no longer be necessary since a single FLEX storage building is being constructed in a location that is well above any postulated flood levels.

Justification: See Change Item #4 in this six month update.

Documentation: Open Item 27.

- 7) Change: A Phase 2 strategy discussed in the OIP states that discharge hoses from a portable pump located at the SNSWP will be routed to the suction of a second pump to be located between the Unit 1 and Unit 2 Reactor buildings with the discharge hoses of the second pump being routed to the Auxiliary Feedwater (CA) system connections located in the interior and exterior doghouses. The current strategy for supplying water from the SNSWP to the Steam Generators via portable pumps will employ the use of a pump staged near the Unit 1 doghouse and another pump staged near the Unit 2 doghouse in lieu of a single pump staged between the Unit 1 and Unit 2 Reactor buildings feeding both Units Steam Generators. The single pump was going to be the Hale 1500 gpm pump listed in the PWR Portable Equipment Phase 2 table in the OIP. The Hale 1500 gpm portable diesel driven pump should be deleted from this table. These pumps will also be used for Reactor Coolant System (RCS) makeup during Modes 5 and 6 and will not be staged in the Auxiliary building.

Justification: Change #2 described in Section 4 of the Second Six Month Status Report Update states that pumps are being purchased for the low pressure Steam Generator makeup strategy that can also be used for Reactor Coolant System (RCS) borated water makeup during Modes 5 and 6. The performance of these pumps is such that one pump per unit is required for these strategies. The pump being purchased is powered by a diesel engine, not an electric motor as originally thought. As such, it must be operated in an area with adequate ventilation (outdoors) and will stored in a protected structure when not in service.

Documentation: Open Items 37 and 53.

- 8) Change: The OIP stated that a high pressure pump used for RCS makeup during Phase 2 would be staged locally in the Category I Auxiliary building. The pump being purchased for high pressure RCS makeup will now be stored in the single hardened FLEX equipment building and will be deployed to a location in the yard next to the Auxiliary building when needed.

Justification: The pump being purchased is powered by a diesel engine, not an electric motor as originally thought. As such, it must be operated in an area with adequate ventilation (outdoors). Based on current analysis, adequate time exists to deploy this pump from the FLEX storage building and place it in operation.

Documentation: Open Item 37.

**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 and second six month status reports (References 1, 3, and 4 in Section 7). The table under Section 6.b. provides a list of Open Items that were added after January 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, and the Second 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.	Started
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.	Not 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

Item	Overall Integrated Plan Open Item	Status
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
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.	Not 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

Item	Overall Integrated Plan Open Item	Status
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
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.	Not 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.	Not 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.	Not 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.	Not Started
29	Develop a Document for the FLEX program. See Corrective Action 51 in PIP C-12-2291.	Started

Item	Overall Integrated Plan Open Item	Status
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
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.	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.	Started
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.	Started
44	Determine lighting requirements via Corrective Action 31 in PIP C-11-6867.	Complete

Item	Overall Integrated Plan Open Item	Status
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
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.	Not Started
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.	Started
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.	Started
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.	Not 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.	Started

Item	Overall Integrated Plan Open Item	Status
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.	Not 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.	Not Started
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.	Not Started
62	Determine if portable lighting will be required from the RRC during Phase 3. See Corrective Action 66 in PIP C-12-2291.	Not 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.	Not Started
65	Determine Phase 3 requirements related to Commodities such as food and water. See Corrective Action 69 in PIP C-12-2291.	Not Started
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 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.	Not 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

Item	Overall Integrated Plan Open Item	Status
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
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.	Started
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.	Not 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.	Not 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.	Not 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.	Not Started



Item	Overall Integrated Plan Open Item	Status
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.	Not 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.	Not Started

b. Open Items added after January 28, 2014.

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.	Not 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.	Not Started
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 in PIP C-12-2291.	Not 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.	Not Started
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 in PIP C-12-2291.	Not Started

Item	Overall Integrated Plan Open Item	Status
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

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.	Open
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.	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.	Open
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.	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.	Open
3.2.1.3.A	Westinghouse will be assisting CNS in providing further information regarding decay heat modeling. Evaluate for applicability and implementation.	Open

Item	Interim Staff Evaluation Confirmatory Item	Status
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.	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.	Open
3.2.4.3.A	Evaluations to address the needs for freeze protection are in progress. Confirm completion of evaluations and appropriate actions.	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.	Open
3.2.4.4.B	Confirm upgrades to the site's communication systems have been completed.	Open
3.4.A	Offsite Resources- Confirm NEI 12-06 Section 12.2, Guidelines 2 through 10, are addressed with SAFER.	Open

Duke Energy will incorporate the supplemental guidance provided in the NEI position paper entitled "Shutdown/Refueling Modes" to enhance the shutdown risk process and procedures.

Catawba will incorporate the guidance provided in the Westinghouse position paper entitled "Westinghouse Response to NRC Generic Request for Additional information (RAI) on Boron Mixing in support of the Pressurizer Water Reactor Owners Group (PWROG)" (ADAMS Accession Number ML13235A135) with the following clarifications:

1. The required timing for providing borated makeup to the primary system should consider conditions with no reactor coolant system leakage and with the highest applicable leakage rate for the reactor coolant pump seals and unidentified reactor coolant system leakage.
2. For the condition associated with the highest applicable reactor coolant system leakage rate, two approaches have been identified, either of which is acceptable to the staff:
  - a. Adequate borated makeup should be provided such that the loop flow rate in two phase natural circulation does not decrease below the loop flow rate corresponding to single-phase natural circulation.
  - b. If loop flow during two-phase natural circulation has decreased below the single phase natural circulation flow rate, then the mixing of any borated primary makeup added to the reactor coolant system is not to be credited until one hour after the flow in all loops has been restored to a flow rate that is greater than or equal to the single-phase natural circulation flow rate.

3. In all cases, credit for increases in the reactor coolant system boron concentration should be delayed to account for the mixing of the borated primary makeup with the reactor coolant system inventory. Provided that the flow in all loops is greater than or equal to the corresponding single-phase natural circulation flow rate, the staff considers a mixing delay period of one hour following the addition of the targeted quantity of boric acid to the reactor coolant system to be appropriate.

The boron mixing guidance above has been incorporated into DPC-1552.08-00-0278/CNC-1552.08-00-0503 (Boration Analysis for Extended Loss of AC Power at MNS/CNS) Rev. 1.

The NRC has recently endorsed the following Generic Issues associated with FLEX:

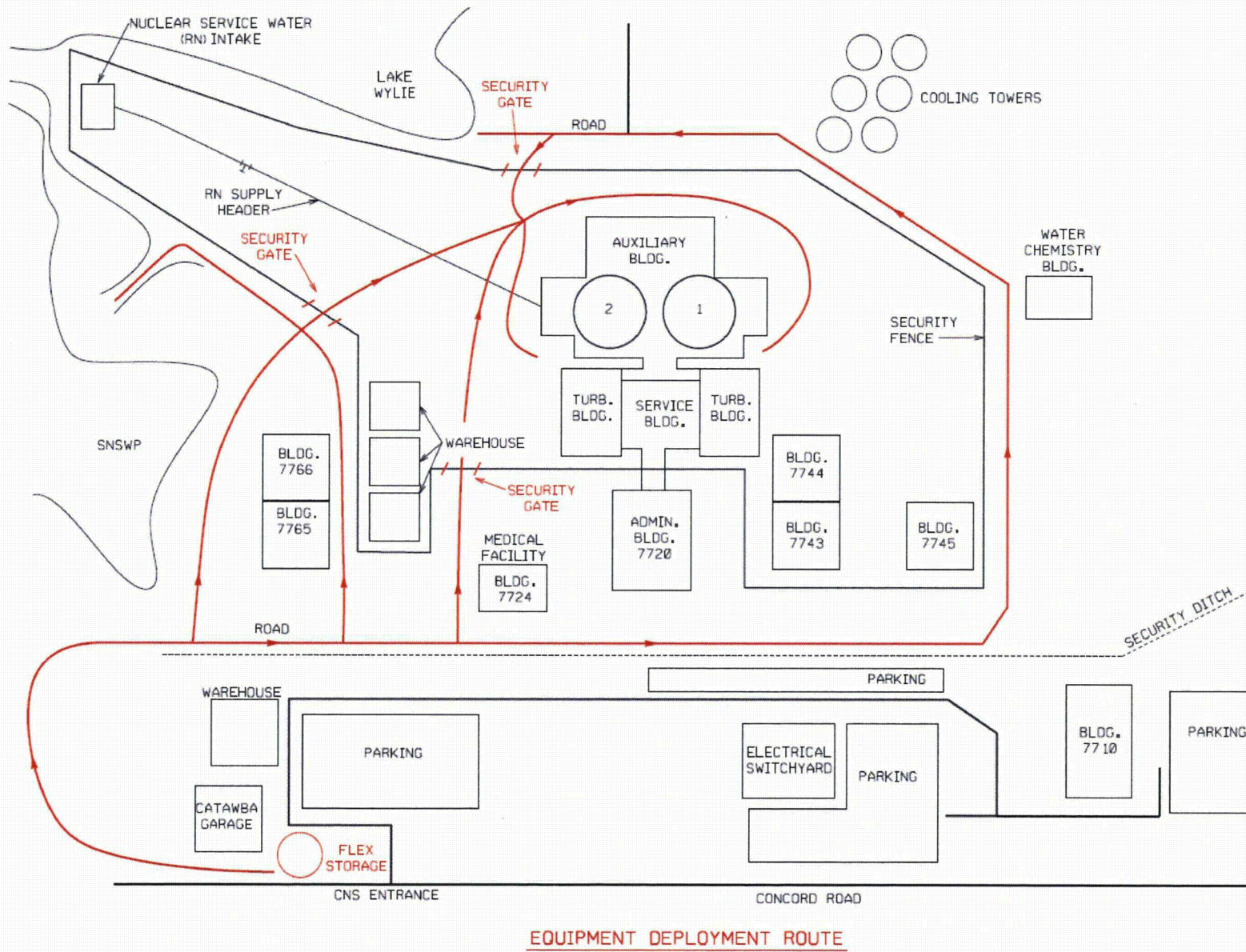
1. Use of the MAAP4 computer code in simulating the Extended Loss of AC Power (ELAP) event for Boiling Water Reactors (BWR). Catawba Nuclear Station will not abide by this generic resolution.
2. Westinghouse report entitled "Westinghouse Response to NRC Generic Request for Additional Information (RAI) on CENTS Code in Support of the Pressurized Water reactor Owners Group (PWROG)". Duke Energy will not abide by this generic resolution

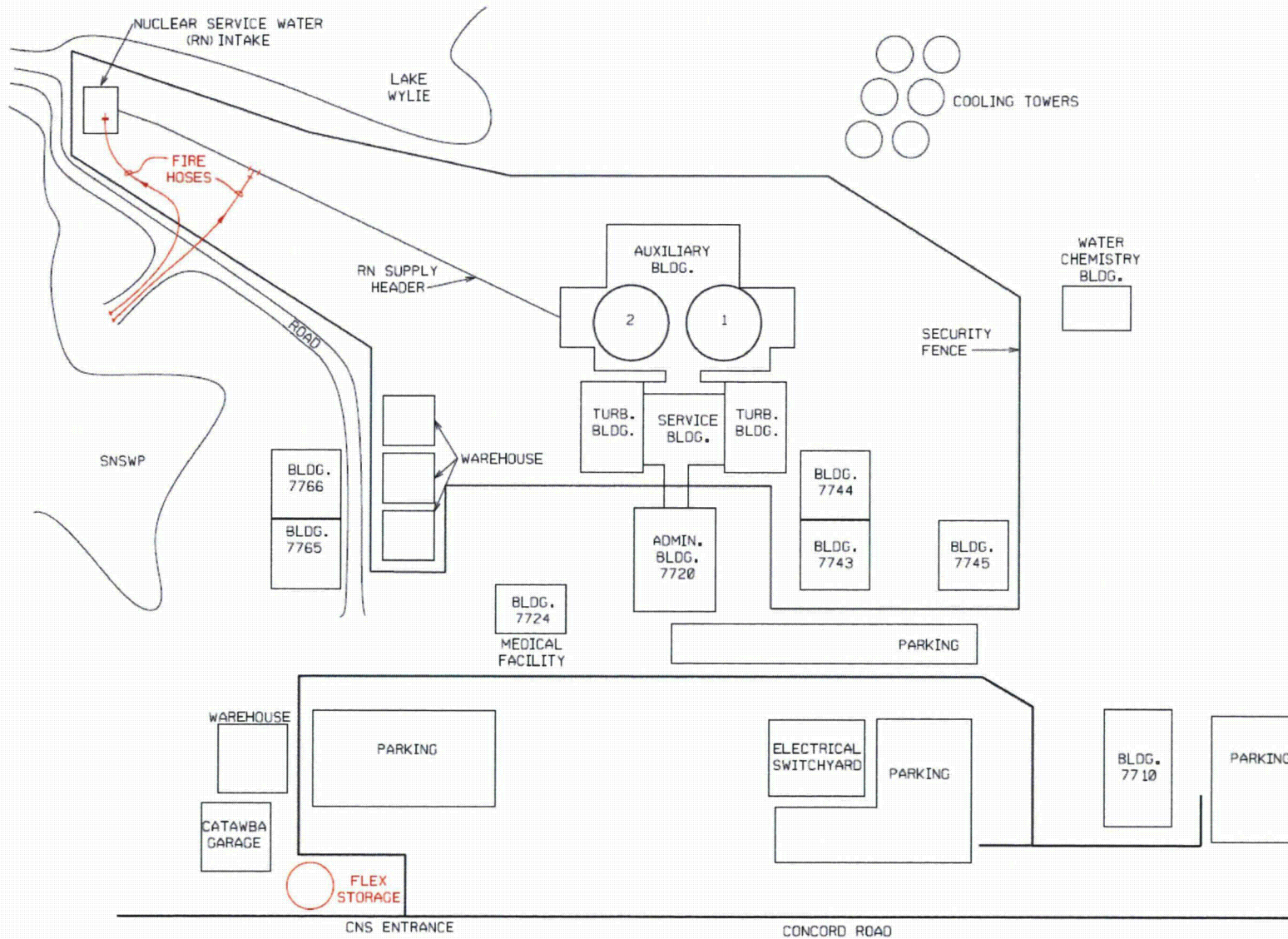
## 7 References

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

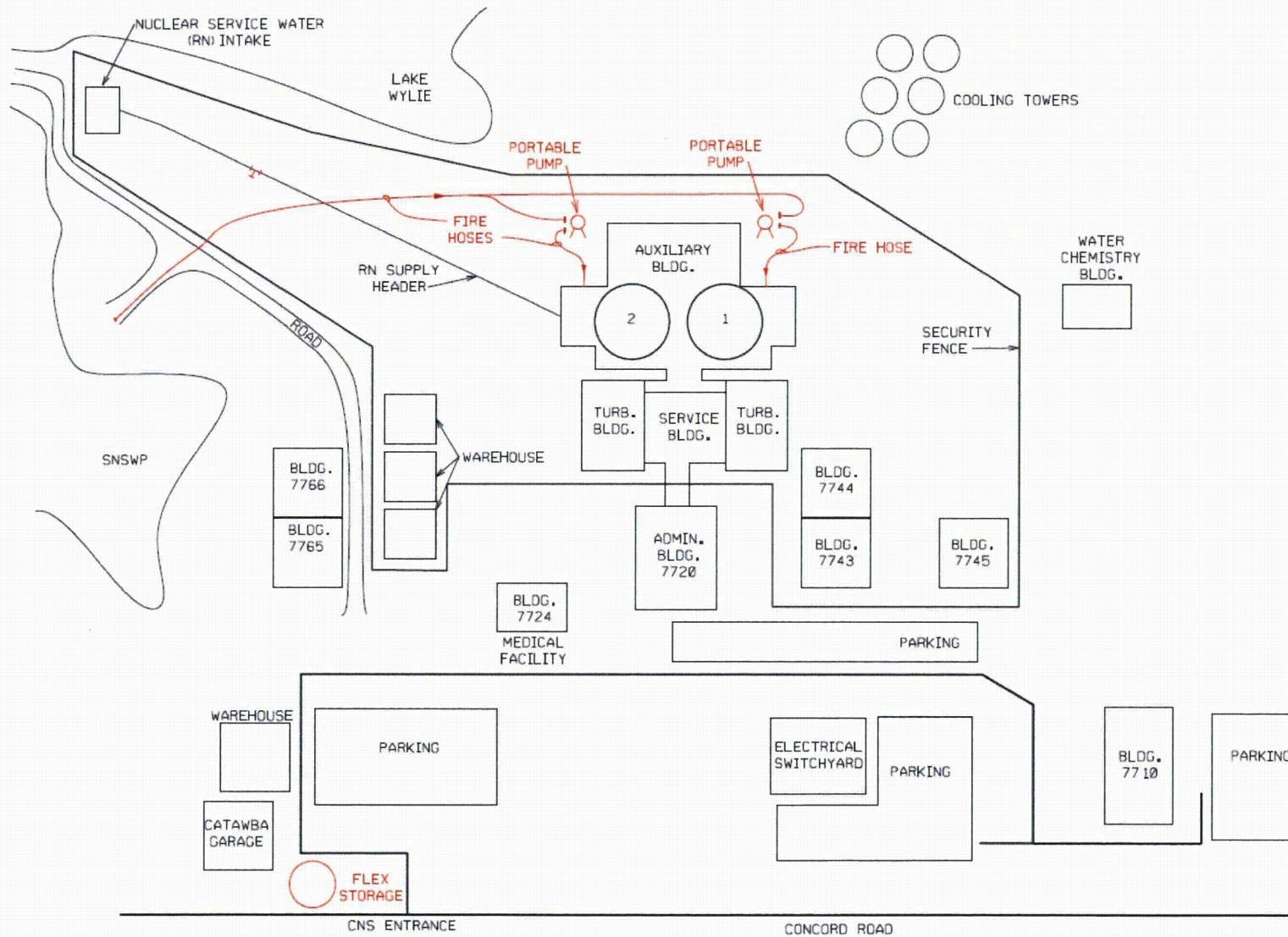
- 1) Catawba Nuclear Station, Unit Nos. 1 and 2, Overall Integrated Plan in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049), dated February 28, 2013.
- 2) NRC Order Number 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) 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).
- 6) NEI 12-06, Diverse and Flexible Coping Strategies (FLEX) Implementation Guide, Revision 0, dated August 2012
- 7) 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).

- 8) 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).
- 9) 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)
- 10) 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)
- 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, dated January 8, 2014, (ADAMS Accession No. ML13276A183)
- 12) 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)





PORTABLE PUMP SUPPLY TO ESSENTIAL SERVICE WATER HEADER / STORAGE FACILITY LOCATION



PORTABLE PUMP SUPPLY TO SG's