



Steven D. Capps
Vice President
McGuire Nuclear Station

Duke Energy
MG01VP | 12700 Hagers Ferry Road
Huntersville, NC 27078
o: 980-373-2544
f: 704-382-6056

August 28, 2013

10CFR50.4

ATTN: Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Duke Energy Carolinas, LLC (Duke Energy)

McGuire Nuclear Station, Units 1 and 2
Docket Nos. 50-369 and 50-370
Renewed License Nos. NPF-9 and NPF-17

Subject: First 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. 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, 2012, Accession No. ML12056A045
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, dated August 29, 2012, Accession No. ML12229A174
3. NEI 12-06, Diverse and Flexible Coping Strategies (FLEX) Implementation Guide, dated August 2012
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, Accession No. ML12307A023
5. McGuire 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, Accession No. ML13063A185

On March 12, 2012, the 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.

A151
NRR

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 pursuant to Section IV, Condition C. Reference 2 endorses industry guidance document NEI 12-06, Revision 0 (Reference 3) with clarifications and exceptions identified in Reference 2. Reference 4 provided Duke Energy's initial status report regarding mitigation strategies at the Catawba, McGuire, and Oconee Nuclear Stations. Reference 5 provided Duke Energy's overall integrated plan for the McGuire Nuclear Station.

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 first six-month status report pursuant to Section IV, Condition C.2, of Reference 1, that delineates progress made in implementing the requirements of Reference 1. The enclosed 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. If you have any questions regarding this report, please contact George Murphy, at (980) 875-5715.

I declare under penalty of perjury that the foregoing is true and correct. Executed on August 28, 2013.

Respectfully submitted,



Steven Capps

Enclosure

1. First Six-Month Status Report (Order EA-12-049), McGuire Nuclear Station (MNS), Units 1 and 2, Docket Nos. 50-369 and 50-370, Renewed License Nos. NPF-9 and NPF-17

United States Nuclear Regulatory Commission
August 28, 2013
Page 3

xc:

V.M. McCree, Region II Administrator
U.S. Nuclear Regulatory Commission
Marquis One Tower
245 Peachtree Center Avenue NE, Suite 1200
Atlanta, Georgia 30303-1257

J.P. Boska, Project Manager (ONS)
U.S. Nuclear Regulatory Commission
One White Flint North, Mailstop O-8G9A
11555 Rockville Pike
Rockville, MD 20852-2738

J.C. Paige, Project Manager (MNS and CNS)
U.S. Nuclear Regulatory Commission
One White Flint North, Mailstop O-8C2A
11555 Rockville Pike
Rockville, MD 20852-2738

J. Zeiler
NRC Senior Resident Inspector
McGuire Nuclear Station

J. Folkwein
American Nuclear Insurers
95 Glastonbury Blvd., Suite 300
Glastonbury, CT 06033-4453

ENCLOSURE

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

MCGUIRE NUCLEAR STATION (MNS), UNITS 1 AND 2

DOCKET NOS. 50-369 AND 50-370

RENEWED LICENSE NOS. NPF-9 AND NPF-17

**ENCLOSURE
MNS FIRST SIX MONTH STATUS REPORT (ORDER EA-12-049)**

1. Introduction

McGuire Nuclear Station (MNS) 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 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 February 28, 2013 to July 30, 2013 (hereafter referred to as "the update period").

2. Milestone Accomplishments

No milestones were completed during the update period.

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. The dates are planning dates subject to change as design and implementation details are developed.

There were no revised milestone target completion dates.

Unit 1 Milestones	Target Completion Date	Activity Status	Revised Target Completion Date
Complete Engineering Change Package and Plan Work Orders	03/20/2014	Started	Date Not Revised
Receive all portable FLEX equipment	05/20/2014	Started	Date Not Revised
Transmit results of Phase 2 staffing study	05/20/2014	Not Started	Date Not Revised
Complete all FSGs, AOPs, EOPs, OPs	06/20/2014	Started	Date Not Revised
Complete training for all FSGs, AOPs, EOPs, OPs	09/20/2014	Not Started	Date Not Revised
Complete all Maintenance Procedures	09/20/2014	Not Started	Date Not Revised
Begin Outage (1EOC23)	Fall 2014	Not Started	Date Not Revised
Storage Plan - Reasonable Protection Facilities Complete	Fall 2014	Started	Date Not Revised
Regional Response Center in place	10/19/2014	Started	Date Not Revised

**ENCLOSURE
MNS FIRST SIX MONTH STATUS REPORT (ORDER EA-12-049)**

Unit 2 Milestones	Target Completion Date	Activity Status	Revised Target Completion Date
Complete Engineering Change Package and Plan Work Orders	03/20/2015	Started	Date Not Revised
Receive all portable FLEX equipment	05/20/2015	Started	Date Not Revised
Transmit results of Phase 2 staffing study	05/20/2015	Not Started	Date Not Revised
Complete all FSGs, AOPs, EOPs, OPs	06/20/2015	Started	Date Not Revised
Complete training for all FSGs, AOPs, EOPs, OPs	09/20/2015	Not Started	Date Not Revised
Complete all Maintenance Procedures	09/20/2015	Not Started	Date Not Revised
Begin Outage (2EOC23)	Fall 2015	Not Started	Date Not Revised
Storage Plan - Reasonable Protection Facilities Complete	Fall 2014	Started	Date Not Revised
Regional Response Center in place	10/11/2015	Started	Date Not Revised

4. Changes to Compliance Method

The following summarizes the changes to the compliance method as documented in the Overall Integrated Plan (Reference 1). These changes do not impact McGuire's compliance with NEI 12-06.

- 1) Change: To facilitate the Phase 2 FLEX mitigation response, the high and low pressure make-up pumps for the Reactor Coolant System for each Unit are currently planned to be pre-staged in the Auxiliary Building, near the FLEX connection points. As these areas are within a Category I seismic structure, no spares will be stored in the FLEX buildings for deployment, since "N" pieces of FLEX equipment are already deployed and protected from external hazards. Per NEI 12-06 guidance, this pre-staged equipment will be evaluated for seismic ruggedness, as well as for seismic interaction.

Justification: Section 5.3.1 1(a) of the NEI 12-06 Guidance document states that FLEX equipment can be stored: "In a structure that meets the plant's design basis for the Safe Shutdown Earthquake (SSE) (e.g., existing safety-related structure)." Additionally, regarding the Reasonable Protection requirement in the NEI 12-06 Guidance Document, NEI FAQ 2013-07 states: "No one event, external or reliability based can reasonably fail the site FLEX capability (i.e., a reliability failure and an external event failure are not required to be considered simultaneously)." FLEX equipment pre-staged at the connection site and then employed due to a Beyond Design Basis External Event (BDBEE) would therefore not be subject to a reliability failure.

Documentation: Open Item #49

ENCLOSURE
MNS FIRST SIX MONTH STATUS REPORT (ORDER EA-12-049)

- 2) Change: Section 5.3.2 part 2 of the NEI 12-06 Guidance Document states: "At least one connection point of FLEX equipment will only require access through seismically robust structures. This includes both the connection point and any areas that plant operators will have to access to deploy or control the capability." McGuire Overall Integrated Plan dated February 28, 2013 indicated access to connection points for the Phase 2 FLEX mitigation response will be through structures located at the north end of the McGuire Auxiliary Building, an area which is not seismically designed and has not yet been evaluated for seismic ruggedness. Additionally, the Vermont Yankee NRC EA-12-049 RAI dated June 17, 2013 identified a reviewer question regarding the seismic ruggedness of the access pathway to FLEX equipment described in the submitted OIP (049-RAI-Vermont Yankee-27).

The access pathway via the north end of the McGuire Auxiliary Building as depicted in the McGuire OIP was evaluated and confirmed to be the most limiting with respect to voltage drop due to the Phase 2 FLEX diesel generator cable lengths, and as such was chosen for the submittal. McGuire's seismic access pathway to Phase 2 FLEX equipment will be via one of the Turbine Buildings

Justification: The Turbine Buildings have been evaluated to be seismically robust with respect to the Safe Shutdown Earthquake (SSE) per EPRI NP-6041-SL criteria.

In the unlikely event that other issues hinder travel paths through the turbine building, there are multiple pathways available through the north end of the Auxiliary Building.

It is unlikely that debris from the Beyond Design Basis (BDB) seismic event will block all access pathways. NEI 12-06 Guidance allows for debris removal after a tornado/hurricane/flood event in order to deploy FLEX equipment and strategies. Debris removal to clear travel paths after a seismic event, if necessary, is understood to be required also and response procedures will be designed to cope with that scenario.

Documentation: Open Item #50

- 3) Change: The McGuire Overall Integrated Plan dated February 28, 2013 indicated that if ongoing ELAP response analysis determines Containment temperature and/or pressure will reach unacceptable levels over the long term, connections installed for Section B.5.b containment spray mitigating strategies will be used with the portable diesel driven pumps to supply water from the Ultimate Heat Sink (UHS) to the connections located in the Auxiliary Building. Upon further evaluation, it has been determined that if the FLEX strategy is needed for Containment temperature/pressure mitigation, new connections will be installed and B.5.b connections will not be used.

Justification: If containment temperature/pressure mitigation is determined to be necessary following long-term containment response analysis, it is anticipated that higher flow rates may be required than would be afforded by the present B.5.b connections.

Documentation: Open Item #37

ENCLOSURE
MNS FIRST SIX MONTH STATUS REPORT (ORDER EA-12-049)

- 4) Change: The McGuire Overall Integrated Plan dated February 28, 2013 under Phase 1 Safety Function Support Details that battery voltage would be read from the analog output of the battery charger. Battery voltage will be read from the Main Control Room.

Justification: Battery voltage is an available parameter in the Main Control Room and represents a more realistic scenario.

Documentation: Open Item #12

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

MNS 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 the original OIP submitted on February 28, 2013. The table under Section 6.b. provides a list of open items that were added after February 28, 2013. The table under 6.c. provides a list of open items related to the Draft Safety Evaluation.

- a. Open Items Documented in the Overall Integrated Plan.

Note: status of items marked with an asterisk (*) are in the process of detailed design.

	Overall Integrated Plan Open Item	Status
1	Implement plant modification: Assured Air to the TDAFWP FCVs and SG PORVs	Started*
2	Implement plant modification: Assured Water Supply to the TDAFWPs	Started*
3	Implement plant modification: SFP Wide-Range Level Instrumentation	Started*
4	Implement plant modification: UHF Communication System Upgrades	Started*
5	Implement plant modification: Process Connections	Started*
6	Implement plant modification: Permanent Connections for Portable Electrical Equipment	Started*
7	Implement plant modification: FLEX Storage Facilities	Started*
8	Implement plant modification: Submersible Ground Water Sump Pump	Started*
9	Implement plant modification: FLEX Strategy Implementation	Started*

**ENCLOSURE
MNS FIRST SIX MONTH STATUS REPORT (ORDER EA-12-049)**

10	Implement plant modification: "B" RN to CA Pump Suction Re-route	Started*
11	Implement plant modification: Install Emergency Hardhat Light Storage Boxes and Hardhat Hooks	Complete
12	A staffing Phase 2 study will be performed in accordance with NEI 12-01 to verify that all actions can be taken in accordance with the timeline. Time constraints shown in Attachment 1A will be validated to be reasonable as the strategy is finalized.	Not Started
13	An analysis was performed in Duke Energy Calculation MCC-1223.31-00-0012 that indicates that flooding will not occur for at least 48 hours. This analysis will be revised to demonstrate that this time remains unaffected even if potential sources of water from Auxiliary Building or Turbine Building flooding are considered.	Completed
14	A calculation will be performed to demonstrate that sufficient negative reactivity can be added through use of a pump and a reactor coolant system vent path to achieve xenon free cool down in accordance with the PWROG FSG guidelines.	Started
15	Complete vital battery area room heatup and (see open item #48) hydrogen accumulation calculation to determine if portable fans or HVAC units may be required, and timeframe for deployment.	Started. Description of this Open Item revised per Section 6(b), new Open Item 48.
16	Complete a calculation to determine when elevated interior doghouse temperatures adversely impact the FLEX strategy and to evaluate methods for mitigation.	Started
17	An evaluation will be performed to determine how long raw water can be used to supply SGs without excessively affecting SG capability to remove heat and provide steam to the TDAFW pump. This will help determine when Phase 3 equipment may be needed to assist in providing cleaner water sources.	Started
18	MNS will evaluate the need to provide freeze protection for critical instrumentation and exposed FLEX connections.	Not Started

**ENCLOSURE
MNS FIRST SIX MONTH STATUS REPORT (ORDER EA-12-049)**

19	Methods will be initiated to circulate and cool air in lower containment sub compartments to prevent any adverse impact on critical instrumentation. The response time is based on engineering judgment and will be confirmed by analysis.	Started
20	Deployment routes will be established and are expected to be utilized to transport FLEX equipment to the deployment areas. The identified paths and deployment areas will be accessible during all modes of operation. This deployment strategy will be included within an administrative program in order to keep pathways clear or actions to clear the pathways.	Not Started
21	MNS will implement programmatic controls in accordance with NEI 12-06. Procedures and guidelines will be reviewed and revised and/or generated as required to address additional programmatic controls as a result of FLEX requirements.	Not Started
22	Equipment associated with FLEX mitigation strategies will be procured as commercial equipment with design, storage, maintenance, testing, and configuration control in accordance with NEI 12-06 Section 11.1.	Started*
23	Installed structures, systems and components pursuant to 10 CFR 50.63(a) will continue to meet augmented guidelines of Regulatory Guide (RG) 1.155, Station Blackout.	Started*
24	The unavailability of equipment and applicable connections that directly perform a FLEX mitigation strategy will be managed using plant equipment control guidelines developed in accordance with NEI 12-06 Section 11.5.	Not Started
25	Programs and processes will be established to ensure that personnel proficiency in the mitigation of beyond-design-basis events is developed and maintained in accordance with NEI 12-06 Section 11.6.	Not Started

**ENCLOSURE
MNS FIRST SIX MONTH STATUS REPORT (ORDER EA-12-049)**

26	The FLEX strategies and basis will be maintained in overall FLEX basis documents.	Not Started
27	Existing plant configuration control documents will be modified to ensure that changes to the plant design, physical plant layout, roads, buildings, and miscellaneous structures will not adversely impact the approved FLEX strategies in accordance with NEI 12-06 Section 11.8.	Not Started
28	Training will be initiated through the Systematic Approach to Training (SAT) process. Training will be developed and provided to all involved plant personnel based on any procedural changes or new procedures developed to address and identify FLEX activities. Applicable training will be completed prior to the implementation of FLEX.	Not Started
29	The industry will establish two Regional Response Centers (RRCs) to support utilities during beyond-design-basis events.	Started
30	The N+1 FLEX storage facilities will be designed in accordance with ASCE 7-10, Minimum Design Loads for Buildings and Other Structures. The FLEX storage facilities will be designed in accordance with ASCE 7-10, to withstand the maximum anticipated hurricane and tornado winds as outlined in NEI 12-06. The FLEX buildings will be located in accordance with NEI 12-06 Section 7.3.1 to prevent damage to more than one of the three facilities due to tornado missiles.	Started
31	FLEX storage facilities will be located above any potential site flood level, and/or the effects of localized flooding will be evaluated in the FLEX facility design and equipment deployment.	Started
32	Debris removal/remediation equipment and procedures will be provided to support FLEX equipment deployment.	Not Started
33	Snow and ice removal/remediation equipment and procedures will be provided to support FLEX equipment deployment.	Not Started

**ENCLOSURE
MNS FIRST SIX MONTH STATUS REPORT (ORDER EA-12-049)**

34	FLEX equipment will be capable of operation under extreme temperatures, and suitably maintained to ensure standby readiness. FLEX storage facilities will be designed to accommodate maximum snow and ice loading. FLEX storage facilities will be vented to maintain acceptable temperature.	Started
35	An evaluation will be performed to ensure that the 300 gpm pump is capable of adequate flow and pressure to support feed and bleed core cooling in typical Mode 5 and Mode 6 configurations.	Started
36	Since the overall FLEX strategy is aimed at preventing core damage, the engineering change process will drive out an evaluation to prioritize operator actions associated with containment isolation as time allows. For example, the containment isolations to the Containment Ventilation Unit Condensate Drain Tank (VUCDT) will be closed first since this path connects containment atmosphere directly to the Auxiliary Building.	Completed
37	An analysis will be performed to validate that containment spray for temperature/pressure control is not required over the long term. If the long term containment analysis determines that containment temperature and/or pressure will reach unacceptable levels over the long term, connections will be installed for containment spray mitigating strategies and will be used with the portable diesel driven pumps to supply water from the UHS to the connections located in the Auxiliary Building.	Started. Description of this Open Item revised per Section 4, item 3.
38	Fans in containment that circulate air will be restored as required to cool the cubicle areas and to prevent the increase in temperature from having an adverse impact on essential instrumentation. The engineering change process will drive out an evaluation to determine the appropriate timing of these actions.	Started
39	Evaluate other long term strategies for cooling containment such as circulating the air volume in the annulus.	Started

**ENCLOSURE
MNS FIRST SIX MONTH STATUS REPORT (ORDER EA-12-049)**

40	<p>In order to prevent or mitigate this inevitability [i.e., vital battery depletion]:</p> <ol style="list-style-type: none"> 1. Portable power distribution equipment will be used to re-power the vital batteries, or 2. An alternate strategy to deploy portable generators and cables will be developed to directly reestablish power to the power supplies in the 7300 cabinets thereby re-powering the instrumentation loops, or 3. An alternate strategy to utilize handheld instruments will be developed to tap into the instrument loops locally to monitor essential parameters. 	Started
41	<p>An analysis was completed to demonstrate that adequate control room cooling would be available if action was taken to open various doors at around 2 hours after the event occurs. This action will be incorporated into procedures.</p>	Completed
42	<p>An evaluation will be performed to determine diesel fuel, gasoline and two-cycle oil requirements for Phase 1 and Phase 2 portable equipment.</p>	Started
43	<p>Analysis will be performed to determine commodities requirements.</p>	Started
44	<p>Evaluate SFP to ensure predicted makeup water dilution rates in the Spent Fuel Pools for the coping strategies described herein are bounded.</p>	Completed
45	<p>Analysis will be performed to determine radiation protection equipment requirements.</p>	Completed
46	<p>These instruments [i.e., Essential Instrumentation and Vital I&C] will be used in the FSGs in accordance with the PWROG guidance. Setpoint uncertainty analyses will be developed in accordance with PWROG guidance.</p>	Not Started
47	<p>A portable battery pack with inverter is also being evaluated for use. The battery pack would be rapidly deployed for use to close the CLA motor-operated valves (MOVs) outside of containment penetration without reliance on the valve's limit or torque switches or the valve's relay circuitry.</p>	Evaluation completed - concluded not to use portable battery pack.

ENCLOSURE
MNS FIRST SIX MONTH STATUS REPORT (ORDER EA-12-049)

b. Open Items added after February 28, 2013

Overall Integrated Plan Open Item	Status
Open Item #48: Complete vital battery area room heatup calculation to determine if portable fans or HVAC units may be required, and the timeframe for deployment. (Reference open item 15)	Started
Open Item #49: To facilitate the Phase 2 FLEX mitigation response, the high and low pressure make-up pumps for the Reactor Coolant System for each Unit are currently planned to be pre-staged in the Auxiliary Building, near the FLEX connection points. As these areas are within a Category I seismic structure, no spares will be stored in the FLEX buildings for deployment, since "N" pieces of FLEX equipment are already deployed and protected. Per NEI 12-06 guidance, this equipment will be evaluated for seismic ruggedness.	Started
Open Item #50: Access to connection points for the Phase 2 FLEX mitigation response will be through the north end of the McGuire Auxiliary Building, an area which is not seismically designed. Section 5.3.2 part 2 of the NEI 12-06 Guidance Document states: "At least one connection point of FLEX equipment will only require access through seismically robust structures. This includes both the connection point and any areas that plant operators will have to access to deploy or control the capability." Evaluate Auxiliary Building access points for possible qualification of seismic ruggedness.	Started
Open Item #51: Reference OI #30. NEI 12-06 Guidance clarification documented in NEI FLEX Guidance Inquiry no. 2013-07 identifies that FLEX buildings designed for hurricane wind speeds and using diverse locations per Section 7.3.1 part (c) are protected from both tornado and hurricane generated missiles. Validate strategy with NEI.	Started

c. Draft Safety Evaluation

Draft Safety Evaluation Open Item	Status
SE not started	NA

ENCLOSURE
MNS FIRST SIX MONTH STATUS REPORT (ORDER EA-12-049)

7. Potential Draft Safety Evaluation Impacts

There are no potential impacts to the Draft Safety Evaluation identified at this time.

8. References

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

- 1) McGuire Nuclear Station, 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) Justification for closure of Open Item 11 in the Overall Integrated Plan is contained in Actual Corrective Action 41 of PIP M-12-1952
- 4) Justification for closure of Open Item 13 in the Overall Integrated Plan is contained in Actual Corrective Action 43 of PIP M-12-1952.
- 5) Justification for closure of Open Item 36 in the Overall Integrated Plan is contained in Actual Corrective Action 66 of PIP M-12-1952.
- 6) Justification for closure of Open Item 41 in the Overall Integrated Plan is contained in Actual Corrective Action 71 of PIP M-12-1952.
- 7) Justification for closure of Open Item 44 in the Overall Integrated Plan is contained in Actual Corrective Action 74 of PIP M-12-1952.
- 8) Justification for closure of Open Item 45 in the Overall Integrated Plan is contained in Actual Corrective Action 75 of PIP M-12-1952.
- 9) Justification for closure of Open Item 47 in the Overall Integrated Plan is contained in Actual Corrective Action 77 of PIP M-12-1952.