Benjamin C. Waldrep
Vice President
Harris Nuclear Plant
5413 Shearon Harris Road
New Hill NC 27562-9300

919.362.2000

February 23, 2015
Serial: HNP-15-006

10 CFR 50.4

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

Duke Energy Progress, Inc., (Duke Energy)
Shearon Harris Nuclear Power Plant (HNP), Unit 1
Docket No. 50-400
Renewed License Number NPF-63

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, (Agency-wide Documents Access and Management System (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. Nuclear Energy Institute (NEI) 12-06, *Diverse and Flexible Coping Strategies (FLEX) Implementation Guide*, Revision 0, dated August 2012 (ADAMS Accession No. ML12242A378)
4. Duke Energy Letter, *Carolina Power and Light Company and Florida Power Corporation'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 Number EA-12-049),* dated October 29, 2012, (ADAMS Accession No. ML12307A021)
5. Duke Energy Letter, *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, (ADAMS Accession No. ML13112A020)
6. Duke Energy Letter, *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),* dated August 27, 2013, (ADAMS Accession No. ML13239A359)
7. Duke Energy Letter, *Second 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),* dated February 27, 2014, (ADAMS Accession No. ML14072A051)

8. Duke Energy Letter, *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),* dated August 25, 2014, (ADAMS Accession No.ML14241A115)

Ladies and Gentlemen,

On March 12, 2012, the Nuclear Regulatory Commission (NRC) issued Order EA-12-049 (Reference 1) to Duke Energy Progress, Inc. 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 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 the Duke Energy initial status report regarding mitigation strategies. Reference 5 provided the Duke Energy overall integrated plan for HNP.

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, 7, and 8 provided the first, second, and third six-month status reports, respectively for Shearon Harris Nuclear Power Plant, Unit 1 (HNP).

The purpose of this letter is to provide the fourth 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 and no revision to existing Regulatory Commitments.

Should you have any questions regarding this submittal, please contact Mr. David H. Corlett, Regulatory Affairs Manager, at 919-362-3137.

I declare under penalty of perjury that the foregoing is true and correct.
Executed on February 23, 2015.

Sincerely,

Benjamin C. Waldrep

Enclosure:

Fourth Six-Month Status Report (Order EA-12-049) Shearon Harris Nuclear Power Plant, Unit 1, Docket No. 50-400, Renewed License Number NPF-63

cc: Mr. J. D. Austin, NRC Sr. Resident Inspector, HNP
Ms. M. Barillas, NRC Project Manager, HNP
Mr. V. M. McCree, NRC Regional Administrator, Region II
Mr. S. R. Monarque, NRC Japan Lessons-Learned Project Manager, HNP

SERIAL HNP-15-006

ENCLOSURE

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

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1

DOCKET NO. 50-400

RENEWED LICENSE NUMBER NPF-63

1 Introduction

Duke Energy Progress, Inc., (Duke Energy) developed an Overall Integrated Plan (OIP) (Reference 1), for the Shearon Harris Nuclear Power Plant (HNP), Unit 1, documenting the diverse and flexible strategies (FLEX), in response to NRC Order EA-12-049 (Reference 3). The Overall Integrated Plan was submitted to the NRC on February 28, 2013. The first six-month update was provided to the NRC on August 28, 2013 (Reference 2). The second six-month update was provided to the NRC on February 28, 2014 (Reference 17). The third six-month update was provided to the NRC on August 25, 2014 (Reference 19). 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 28, 2014, to January 29, 2015 (hereafter referred to as "the update period").

2 Milestone Accomplishments

The following milestones were completed during the update period:

1) Submit Third Six-Month Update

2) Develop Modifications

3) Conduct Staffing Analysis

4) Install Offsite Delivery Pad

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.

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 Integrated Plan	February 28, 2013	Complete	Date Not Revised
6-Month Status Update	August 28, 2013	Complete	Date Not Revised
Conduct N-1 Outage Walkdowns	November 2013	Complete	Date Not Revised
Identify Significant Material/Equipment	February 2014	Complete	Date Not Revised
6-Month Status Update	February 28, 2014	Complete	Date Not Revised

Milestone	Target Completion Date	Activity Status	Revised Target Completion Date
Develop Strategies / Playbook with Regional Response Center (RRC)	March 2015	Started	April 2015
Develop Training Program	September 2014	Started	April 2015
6-Month Status Update	August 28, 2014	Complete	Date Not Revised
Develop Modifications	October 2014	Complete	Date Not Revised
Conduct Implementation Walkdowns	December 2014	Started	April 2015
Material / Equipment Procurement / Delivery	December 2014	Started	April 2015
Conduct Staffing Analysis	November 2014	Complete	Date Not Revised
Implement Training	May 2015	Started	April 2015
Install Offsite Delivery Pad	February 2015	Complete	Date Not Revised
6-Month Status Update	February 28, 2015	Started	Date Not Revised
Develop FLEX Strategy Guidelines (FSGs)	March 2015	Started	Date Not Revised
Develop Maintenance Procedures	March 2015	Started	Date Not Revised
Implement Modifications	May 2015	Started	Date Not Revised
Implementation Complete	May 2015	Not 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) since the last six-month update period (numbering sequence is a continuation of the last six-month update).

8) Change: The FLEX Diesel Generators are pre-staged in the HNP Unit 2B Diesel Bay. During the onsite audit in December 2014, the NRC concluded that pre-staging of the FLEX Diesel Generators is an alternative approach to NEI 12-06, “Diverse and Flexible Coping Strategies (FLEX) Implementation Guide,” Revision 0 (Reference 5), which describes the use of portable equipment.

Justification: HNP agrees with the NRC’s position that use of pre-staged FLEX Diesel Generators constitutes an alternative to NEI 12-06, Revision 0. The use of pre-staged FLEX Diesel Generators allows re-energizing critical plant electrical loads more quickly

and efficiently than the use of portable generators that would have to be transferred from the FLEX storage building.

The FLEX Diesel Generators are stored in a Category 1, safety-related structure designed to adequately withstand all external events with multiple access paths that will remain clear after the initiating event. The FLEX Diesel Generators have been pre-staged to provide a significant reduction in the amount of large portable equipment required to be transported and setup, in the first hours following a beyond-design-basis external event. Pre-staging provides a level of efficiency that ensures the timeline for implementation of the HNP FLEX electrical support configuration. The strategy also minimizes risk by utilizing robust equipment that is located within a Category 1, safety-related structure that is adequately protected from all external events. The opportunity to improve response times, simplify required manual actions, and to utilize robust equipment in robust locations justifies the consideration of this strategy.

Documentation: A detailed justification for the consideration of this strategy will be provided in a position paper and posted on the HNP Fukushima Response ePortal prior to implementation.

9) Change: HNP has two FLEX Buildings. The first building is the HNP Unit 2 Emergency Diesel Generator Building that is a Category 1, safety-related structure designed to provide protection from the applicable site-specific severe external events. The second building is a commercial metal building constructed to North Carolina building codes. All "N" and "N+1" equipment that directly performs a FLEX mitigating function is stored in the HNP Unit 2 Emergency Diesel Generator Building with one exception. The spare (N+1) Emergency Service Water (ESW) pump is stored in the commercial metal building. During the onsite audit in December 2014, the NRC concluded that the use of the commercial building is an alternative to NEI 12-06, Revision 0, which describes the storage of FLEX equipment.

Justification: HNP agrees with the NRC's position that the FLEX ESW pump ("N+1" equipment) stored in the commercial metal building, in conjunction with equipment stored in the Seismic Category 1 storage building ("N"), constitutes an alternative to NEI 12-06, Revision 0, which describes the storage of FLEX equipment.

Documentation: A description of this strategy and the equipment out of service/unavailability limits will be provided in a paper and posted on the HNP Fukushima Response ePortal prior to implementation.

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

HNP 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 Reference 1 submitted on February 28, 2013. 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).

a. Open Items Documented in the Overall Integrated Plan.

Overall Integrated Plan Open Item		Status
1	Analysis to determine expected duration of TDAFW pump operation under ELAP conditions	Complete
2	Staging analysis timeline of FLEX feedwater pump and plant specific pump analysis at chosen FLEX injection points and water sources specifically for HNP	Complete
3	Determine highest rate of RCS cooldown with only one SG PORV	Complete
4	Determine if B.5.b connections 1AF-173/174/175 are adequately sized to meet SG feedwater requirements from decay heat (not credited)	Complete
5	Determine how much time the CST can be relied upon for	Complete
6	Projected Inventory usage for RCS and SGs	Started
7	Determine the amount of SG inventory needed for the first 72 hours per cooldown strategy in PA-PSC-0965	Complete
8	Determine any adverse effects from using borated water from RWST in Steam Generators	Complete
9	Determine HNP specific FLEX FW pump capacity requirements (discharge pressure and flow)	Complete
10	A FLEX/ELAP staffing analysis needs to be performed for all coping Strategies (Reference 20)	Complete
11	Calculation needed to determine the cooling flow requirements beyond the 24 hours in SAMG-CA-002 in Mode 5 and 6	Started
12	RCS boron concentration and boration in gallons to maintain inventory control and core cooling in regards to keeping the core subcritical with RCS cooldown strategy in PA-PSC-0965 Att. 3	Started
13	RWST is partially exposed to tornado missiles and analysis will need to be done to determine the volume that can be credited (Reference 12)	Complete
14	Analysis to determine HNP specific high pressure make up pump minimum performance rating necessary to support FLEX coping strategies	Complete
15	Analysis to determine if the ASI pump can meet the HNP minimum high pressure makeup requirements	Canceled
	Analysis to determine HNP specific Modes 5 and 6 FLEX pump capacity requirements for RCS low pressure Injection	Started
16	Analysis needed to confirm RCS Depressurization via Reactor Vessel Head Vents will be effective	Started
17	Analysis of BAT and RWST during ELAP without heat tracing during cold weather conditions	Complete
18	Determine if RCS venting is needed	Started
19	Analysis to determine minimum pump performance rating to support ESW delivery to all FLEX usage point simultaneously and prevent pump run-out	Complete

Overall Integrated Plan Open Item		Status
20	Analysis to determine HVAC requirements for operating installed and temporary equipment under ELAP conditions for maintaining reliable Operation	Complete
21	Habitability analysis needed for local manual control of SG PORVs in the Steam Tunnel under ELAP conditions	Complete
22	Habitability analysis for local manual control of TDAFW pump at RAB 236 Elevation	Complete
23	Analysis needed for loss of HVAC on TDAFW equipment	Complete
24	Calculation to determine power consumption assuming all HVAC is provided by portable blower units to support selection of FLEX generator size	Complete
25	Analysis to determine total fuel consumption rates of all FLEX equipment	Complete
26	Calculation to determine pounds of boron versus RWST tank level percent to achieve desired boron concentration	Complete
27	Detailed analysis of consequences from performing a DC deep load shed. Specifically to determine what equipment is still needed to carry-out FSG coping functions. Instrument loops and etc.	Started
28	Detailed calculation needed to validate the coping time that will be added to Station Batteries to provide needed margin to the plant's installed equipment's coping time	Started
29	Analysis of the effects of AUX Reservoir water being used for heat removal	Complete
30	Analysis of FLEX pump suction strainer sizes to any downstream FLEX flow path clearances	Complete
31	Containment Pressure & Temperature Analysis at extended time periods (is containment spray needed as a coping action?)	Started
32	Hydrogen production & removal in Battery Rooms	Complete
33	Seismic analysis of lighting fixtures and analysis of lighting needs in the plant during ELAP	Started
34	Analysis needed to determine portable power and pump needs for selected FLEX strategies	Started
35	Analysis to determine expected length of time for FLEX equipment to operate under extended ELAP conditions based on operation condition	Started
36	Analysis to provide delivery path to equipment from Fuel Oil Storage Tanks and FLEX Storage Facility	Complete
37	Determine impact of internal plant flooding events	Complete
38	Boil off analysis of Spent Fuel Pool during full core offload immediately following a full core offload, determine length of coping time without any make-up to SFP immediately following full core offload	Complete
39	Analysis to determine any radiological affects to the public by using contaminated water sources for feedwater use to the Steam Generators	Started

Overall Integrated Plan Open Item		Status
40	Modification - Harden/Protect Dedicated Shutdown Diesel Generator to provide power to MCC 1D23	Canceled
41	Modification - Seismically upgrade the Alternate Seal Injection System to serve as one coping strategy to provide High Pressure RCS injection	Canceled
42	Modification - Add an Alternate Seal Injection pump discharge path to the CVCS charging header. Add an alternate suction path to the Alternate Seal Injection pump from the RWST and BAT. Provides alternate injection paths to the RCS while also providing a larger inventory source	Canceled
43	Modification - Protect and seismically upgrade MCC 1D23 and all connections/distribution. Provides power to Safety-related Battery Chargers and the Alternate Seal Injection System	Canceled
44	Modification - FLEX Generator(s) electrical connections at: • 1A3-SA 480V Bus (Pri) • 1B3-SB 480V Bus (Pri) • 1A21-SA 480V MCC (Alt) • 1A31-SA 480V MCC (Alt) • 1B21-SB 480V MCC (Alt) • 1B31-SB 480V MCC (Alt) • Primary & Alternate 480 VAC distribution/ control for FLEX pumps, FLEX outlets for lighting, ventilation, etc	Started
45	Modification - Modify control power circuits for A & B SG PORVs to be powered from Instrument Buses SI, SII, or SIV. Modification provides the ability to control steaming/RCS cooldown	Design-Started Implementation-Started
46	Modification - Add FLEX pump suction and discharge connection points to the AFW system upstream of Motor Driven AFW flow control valves. Modification will provide AFW flow control and the ability to provide inventory to the Steam Generators from portable pumps	Design-Started Implementation-Started
47	Modification - Modify MDAFW FCVs control power circuit. Install key switch jumper in to simulate a Motor Driven Auxiliary Feedwater pump breaker closed. ARP 19A (SA) R2 terminal 119 & 120. Provides 125 V DC power to ARP19A(SA) and instrument bus SI for the purpose of operators controlling feedwater flow to the Steam Generators from the MCB	Design-Started Implementation-Started
48	Modification - Add FLEX RCS suction and discharge connection points to CVCS on A & B train. Provides the capability to inject inventory (borated) from a FLEX pump to the RCS from the BAT or RWST	Design-Started Implementation-Started
49	Modification - Add FLEX pump discharge connection points to the Emergency Service Water system. Provides a pressurized water source to CST, RAB & FHB Fire Protection SSE hose station headers, and Spent Fuel Pools	Design-Started Implementation-Started

Overall Integrated Plan Open Item		Status
50	Modification - Add quick connect connection point at 4 inch flanges downstream of valves 2DFO-262 and 2 DFO-280. Allows connection of a FLEX pump to transfer fuel oil from the Fuel Oil Storage Tanks to support fuel delivery to operating FLEX equipment	Design-Complete Implementation-Started
51	Modification - Install enhanced Spent Fuel Pool level indication. Refer to NTTF 7.1	Started
52	Modification - Verify seismic qualification or seismically upgrade piping bounded by valves 1CT-23, 1SF-10, 2SF-10, and 1SF-193. Allows HNP to credit Spent Fuel Make-up from the RWST via the installed Fuel Pool Cooling Pumps which are being powered from a FLEX generator. Also allows HNP to credit ESW Emergency Makeup to Spent Fuel Pools	Design-Started Implementation-Not Started
53	Modification - Add quick connects at tank locations to support transfer of water using a FLEX transfer pump. This allows filling of the Refuel Water Storage Tank from the Reactor Make-up Water Storage Tank, and CST from the Condenser Hotwell, Demineralized Water Storage Tank, Filtered Water Storage Tank, and Refuel Water Storage Tank	Design-Started Implementation-Started
54	Modification - Add FLEX connection points to the Containment Spray System. Abates high pressure/high temperature conditions inside containment	Canceled
55	Modification -Add temporary power cables and connection points at select MOV MCC breaker/control cubicles. Provides the ability to perform a one-time stroke of valves that are needed to be repositioned in an ELAP event	Started
56	Modification - Structure(s) built to house and protect FLEX generators and equipment	Started
57	Modification - Install FLEX distribution network to power FLEX equipment (pumps, ventilation, lighting, power outlets, and temporary power to MOVs)	Started
58	Modification - Upgrade the installed in-plant emergency DC lighting packs with Light Emitting Diode bulbs. This will significantly extend the operating time of the lights installed in the plant	Canceled
59	Modification - Seismically qualify/upgrade the Condenser Hotwell Transfer Suction Piping and add isolation valve. This will significantly increase the credited volume of the Condensate Storage Tank	Canceled
60	Develop a procedure to take local reading in containment electrical penetration, PIC, or RVLIS for all required readings	Complete
61	Contract for offsite fuel delivery	Complete
62	Contract for Demineralized Water Processing Skid or tanker delivery	Complete
63	Perform an analysis to determine the amount of volume for the RMWST that can be credited	Complete

	Overall Integrated Plan Open Item	Status
64	Evaluate to determine that a modification can be implemented with reasonable assurance of success to seismically upgrade the condensate transfer pump suction line penetration to the CST and estimated total CST inventory we can credit. In the current configuration 238K gallons is credited as available and protected (Tank-0020)	Complete
65	Evaluate to determine that a modification can be implemented with reasonable assurance of success considering economic feasibility to harden (seismic, flood & missile protect) the DSDG, MCC 1D23, ASI Pump, ASI Tank, associated system piping and all electric connections/distribution and instrumentation	Complete
66	FLEX 4.2 Programmatic Controls – Implement programmatic controls for review, revision and/or generation of procedures and guidelines as required to address additional programmatic controls as a result of FLEX requirements	Started
67	FLEX 4.2 Programmatic Controls – Implement programs and processes to assure personnel proficiency in the mitigation of beyond-design-basis external events in accordance with NEI 12-06	Started
68	FLEX 4.2 Programmatic Controls – Establish FLEX Strategies and basis in an overall FLEX Basis Document	Started
69	FLEX 4.2 Programmatic Controls – Modify existing plant configuration control procedures to ensure that changes to the plant design, physical layout, roads, buildings, and miscellaneous structures will not adversely impact the approved FLEX Strategies IAW NEI 12-06, Section 11.8	Started
70	FLEX 4.2 Programmatic Controls – Training will be initiated through the Systems 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	Started
71	External Hazards for Structures – Structures to provide protection of the FLEX equipment will be constructed to meet the requirements identified in NEI 12-06, Section 11. The structures will be built prior to the FLEX implementation Date	Started
72	External Hazards for Structures – Develop Procedures and Programs to address storage structure requirements, deployment path requirements, and FLEX equipment requirements relative to the External Hazards applicable to HNP	Started
73	Purchase sufficient amounts of portable equipment to fulfill selected FLEX strategies	Started
74	Initiate PMs and develop testing procedures to support FSG guidelines for FLEX equipment	Started
75	Develop RRC playbook	Started

Overall Integrated Plan Open Item		Status
76	Determine RRC portable equipment requirements (water, boron, etc.)	Complete
77	Determine Phase 3 equipment/commodities requirements (food, fuel, etc.)	Complete
78	Convert to high capacity SAT phone batteries	Complete
79	Modification - Modify SG PORV hydraulic pump motor MCC cubicles to provide for quick connection of a temporary FLEX power source	Started
80	Update OIP submittal document for February 2014	Complete
81	RCP Leakage Calc tracking audit question #17	Started
82	Ensure Compliance with Shutdown Refuel Mode Position Paper	Started
83	Determine which WCAP-17601-P Analyses Apply to HNP	Started
84	Ensure Compliance with EPRI Report 3002000623 PM Basis for FLEX Equipment	Started
85	Add RWST and BAT level instrumentation to Essential Equipment List by updating Attachment 6 of the OIP.	Complete
86	Ensure compliance with NRC Battery Life Issue White Paper.	Started

b. Open Items added after July 28, 2014

Overall Integrated Plan Open Item/Technical review gaps		Status
	None	NA

c. Draft Safety Evaluation

The following table provides a summary status of the Open Items & Confirmatory Open Items from Reference 16.

Item #	Description	Status
3.2.1.8.C	At the time the audit was conducted, the licensee had neither (1) committed to abide by the generic approach discussed above, including the additional conditions specified in the NRC's endorsement letter, nor (2) identified an acceptable alternate approach for justifying the boric acid mixing assumptions in the analyses supporting its mitigating strategy. As such, resolution of this concern for HNP is needed.	Complete

Item #	Description	Status
3.1.1.2.A	The Integrated Plan did not address NEI 12-06 Section 5.3.2, Deployment of FLEX Equipment considerations 4 (if power is required to move or deploy the equipment) and 5 (the means to move FLEX equipment should be provided that is also reasonably protected from the event). This information needs to be provided for review. Response: HNP plans on the use of a tractor outfitted with a front end loader and hitch to relocate FLEX equipment from the Seismic Category I EDG Building to coping strategy locations. The tractor will also be located in the EDG Building with a door capable of withstanding design wind/tornado loadings and missile impacts. This door will be manually operated as per consideration 4 of NEI 12-06 Section 5.3.2. Tracked by Open Item #72.	Complete
3.2.1.3.A	The licensee was requested to address the applicability of assumption 4 from WCAP Section 4.2.1 Input Assumptions - Common to All Plant Types on WCAP-17601, which states that "Decay heat is per ANS 5.1-1979 + 2 sigma, or equivalent," and to provide a discussion regarding the following key parameters used to determine the decay heat: (1) initial power level, (2) fuel enrichment, (3) fuel burnup, (4) effective full power operating days per fuel cycle, (5) number of fuel cycles, if hybrid fuels are used in the core, and (6) fuel characteristics are based on the beginning of the cycle, middle of the cycle, or end of the cycle. If a different decay heat model is used, the licensee was also requested to address the specific model and the acceptability of the model. This Confirmatory Open Item is being tracked by Open Item #83.	Complete
3.2.4.10.C	The licensee was requested to provide a detailed discussion on the loads that will be shed from the DC bus, the equipment location (or location where the required action needs to be taken), and the required operator actions needed to be performed and the time to complete each action. The licensee was requested to explain which functions are lost as a result of shedding each load and discuss any impact on defense in depth and redundancy. This Item is being tracked by Open Item #27.	Complete
3.1.1.3.A	Internal Plant Flooding events - Completion of analysis to determine the impact of internal plant flood events.	Complete
3.1.1.4.A	Off-Site Resources – Confirm RRC local staging area, evaluation of access routes, and method of transportation to the site. Tracked by Open Item #75.	Started

Item #	Description	Status
3.1.4.2.A	The licensee stated that the engineering evaluation required to support the modification identified in licensee-identified Open Item #49 will address configuration and operation of the FLEX equipment under extreme cold, snow, or ice conditions. Licensee-identified Open Item #49 should be reviewed during the 6-month update to ensure that the engineering evaluation was added to it. Response: Criteria to support configuration and operation of FLEX equipment under extreme cold, snow, or ice conditions is provided within the engineering evaluation.	Complete
3.2.1.A	Section 3.2 of WCAP-17601 discusses the Pressurized Water Reactor Owners Group (PWROG)'s recommendations that cover the following subjects for consideration in developing FLEX mitigation strategies: (1) minimizing RCP seal leakage rates; (2) adequate shutdown margin; (3) time initiating cooldown and depressurization; (4) prevention of the RCS overfill; (5) blind feeding an SG with a portable pump; (6) nitrogen injection from safety injection tanks (SITs), and (7) asymmetric natural circulation cooldown (NCC). The licensee should provide a discussion of their position on each of the recommendations discussed above for developing the FLEX mitigation strategies. Specifics of this discussion should include a listing of the recommendations that are applicable to the plant, providing rationale for the applicability, addressing how the applicable recommendations are considered in the ELAP coping analysis, discussing the plan to implement the recommendations, and providing the rationale for each of the recommendations that are determined to be not applicable to the plant. Tracked by Open Item #83. Identified in PWROG-14015-P, HNP is listed as a category 1 plant. Category 1 plants show a maximum No. 1 seal leak rate of 17.5 gpm which is below the generic value listed in WCAP-17601-P.	Complete

Item #	Description	Status
3.2.1.1.A	During the audit process, the licensee was requested to specify which analysis performed in WCAP-17601-P, "Reactor Coolant System Response to the Extended Loss of AC Power Event for Westinghouse, Combustion Engineering and Babcock & Wilcox NSSS Designs," is being applied to HNP. Additionally, the licensee was requested to justify the use of that analysis by identifying and evaluating the important parameters and assumptions demonstrating that they are representative of your site and appropriate for simulating the ELAP transient. The licensee responded by stating that a vendor resource will assist in determining which WCAP-17601-P analyses applies to HNP. The licensee was requested to include and update in the 6-month update. Tracked by Open Item #83. As identified in PWROG-14015-P, HNP is listed as a category 1 plant. Category 1 plants show a maximum No. 1 seal leak rate of 17.5 gpm which is below the generic value listed in WCAP-17601-P.	Complete
3.2.1.1.B	Reliance on the NOTRUMP code for the ELAP analysis of Westinghouse plants is limited to the flow conditions prior to reflux condensation initiation. Provide an acceptable definition for reflux condensation cooling. Tracked by Open Item #83. PWROG-14015-P.	Complete
3.2.1.1.C	The NRC staff noted that a plant specific ELAP containment atmosphere analysis using approved analytical tools must be performed to confirm no action is required to maintain containment and potentially affected instrumentation (licensee-identified Open Item #31). The NRC staff also noted that the SBO analyses discussed above used Modular Accident Analysis Program (MAAP) Version 3 for an analytical tool. Justification for the appropriateness of MAAP3 for containment analyses should be provided. Response: HNP containment analysis is being performed under GOTHIC calculations. Tracked by Open Item #31.	Complete

Item #	Description	Status
3.2.1.2.A	For the plants using Westinghouse RCPs and seals that are not the SHIELD shutdown seals, the RCP seal initial maximum leakage rate should be greater than or equal to the upper bound expectation for the seal leakage rate for the ELAP event (21 gpm/seal) discussed in the PWROG position paper addressing the RCP seal leakage for Westinghouse plants. If the RCP seal leakage rates used in the plant-specific ELAP analyses are less than the upper bound expectation for the seal leakage rate discussed in the position paper, justification should be provided. If the seals are changed to non-Westinghouse seals, the acceptability of the use of non-Westinghouse seals should be addressed, and the RCP seal leakage rates for use in the ELAP analysis should be provided with acceptable justification. Tracked by Open Item #81. As identified in PWROG-14015-P, HNP is listed as a category 1 plant. Category 1 plants show a maximum No. 1 seal leak rate of 17.5 gpm which is below the generic value listed in WCAP-17601-P.	Complete
3.2.1.2.B	In some plant designs, such as those with 1200 to 1300 psia SG design pressures and no accumulator backing of the main steam system power-operated relief valve (PORV) actuators, the cold legs could experience temperatures as high as 580 degrees Fahrenheit before cooldown commences. This is beyond the qualification temperature (550 degrees Fahrenheit) of the O-rings used in the RCP seals. For those Westinghouse designs, a discussion of the information (including the applicable analysis and relevant seal leakage testing data) should be provided to justify that (1) the integrity of the associated O-rings will be maintained at the temperature conditions experienced during the ELAP event, and (2) the seal leakage rate of 21 gpm/seal used in the ELAP is adequate and acceptable. Tracked by Open Item #81. As identified in PWROG-14015-P, HNP is listed as a category 1 plant. Category 1 plants show a maximum No. 1 seal leak rate of 17.5 gpm which is below the generic value listed in WCAP-17601-P.	Complete

Item #	Description	Status
3.2.1.2.C	During the audit process, the licensee responded by stating that for items a, b, c and d, a vendor will assist HNP in addressing these items. For item e, HNP is not installing safe shutdown low leakage seals. For Item f, RCPs are Westinghouse model 93A with a Westinghouse 93ACS seal package. The licensee stated that a vendor will assist HNP in addressing whether or not the reactor coolant pump and seal combination complies with a seal leakage model described in WCAP-17601 and for Item g, HNP intends to conduct a symmetric cooldown in response to ELAP. A licensee-identified Open Item has been generated to track items a, b, c, d, and f. The time table, details of licensee's actions and Open Item number needs to be provided and updated in the 6-month status report. Tracked by Open Items #81 & 83. As identified in PWROG-14015-P, HNP is listed as a category 1 plant. Category 1 plants show a maximum No. 1 seal leak rate of 17.5 gpm which is below the generic value listed in WCAP-17601-P.	Complete
3.2.1.5.A	Confirm RWST and BAT level instrumentation is added to the essential equipment list.	Complete
3.2.1.6.A	The final SOE information when analyses have been completed, including the licensee's validation that defined actions from the FLEX strategies can be completed within the time constraints is needed for review.	Complete
3.2.1.8.A	The licensee was requested to provide an assessment of the potential loss of effectiveness of the boron due the addition of debris with different minerals and chemicals. Response: HNP has sufficient coping capabilities to ensure mitigation strategies are maintained greater than 72 hours (indefinite coping) in Modes 1-4. As provided in Reference 11, sufficient RWST volume exists to provide RCS make up in support of mitigation strategies. Additionally, HNP has accepted involvement in use of the Non-Generic Equipment procurement from the RRC under PO201343 for delivery of a Water Treatment skid as listed in Reference 16, Section 8.7 and Table 9-1. Tracked by Open Item #11 & 12.	Complete
3.2.1.8.B	The licensee responded by stating that analyses addressing re-criticality is in progress and is tracked by licensee-identified Open Item #12 (Boration to keep core subcritical). When these calculations are completed, a summary report discussing the results of these analyses need to be made available for review. Tracked by Open Item #12.	Started
3.2.1.9.A	Completion of analyses to determine adequate performance criteria of FLEX portable pumps to support the licensee's phase 2 FLEX strategies.	Complete

Item #	Description	Status
3.2.3.A	The licensee was requested to provide the completed analysis of the ELAP containment response as specified in licensee-identified Open Item 33 (this should be 31) - Containment Pressure and Temperature Analysis at extended time periods when available, and to discuss whether or not the containment spray is needed as a coping action. The licensee stated that licensee-identified Open Item #31 is tracking completion of Containment analysis as stated. Once the Containment analyses are completed, the licensee was requested to address the questions provided above and provide a summary report of the Containment Analysis for review. Tracked by Open Item #31.	Started
3.2.4.1.A	Confirm completion of analyses demonstrating the expected duration of TDAFW pump operation under ELAP conditions.	Complete
3.2.4.2.A	Confirm analysis for loss of HVAC on TDAFW equipment.	Complete
3.2.4.2.B	Confirm analysis of adequacy of the ventilation provided in the battery room to protect the batteries from the effects of extreme high and low temperatures.	Complete
3.2.4.2.C	Confirm analysis of battery room ventilation to prevent hydrogen accumulation during charging batteries during Phase 2 and 3.	Complete
3.2.4.3.A	Confirm analysis to evaluate the loss of heat tracing for equipment required to implement licensee FLEX strategies.	Complete
3.2.4.4.A	Confirm analysis of lighting needs throughout the plant during ELAP conditions. Tracked by Open Item #33.	Complete
3.2.4.4.B	Communications. Confirm that upgrades to the site's communications systems have been completed.	Complete
3.2.4.6.A	The licensee responded by stating that HNP is performing an evaluation of the environmental conditions in various areas/compartments related to an ELAP event (licensee-identified Open Item #20). The results of the evaluation will be used to determine if any specific actions are required to cope with extreme temperatures. These evaluations, once completed, need to be available for review.	Complete
3.2.4.7.A	The licensee stated that HNP has determined not to pursue the CST non-seismic piping modification. As a result, only 238,000 gallons can be credited following a seismic event. The licensee was asked how long the CST can be relied upon assuming the reduced water capacity. The licensee stated that licensee-identified Open Item #5 is being evaluated with vendor assistance. Completion of the analysis determines the amount of time that the CST can be relied upon. The results need to be available for review.	Complete
3.2.4.7.B	The licensee stated that credit for partial protection of the RWST from tornado missiles is pending further analysis. Confirm analysis that determines the volume that can be credited for a borated water source from the RWST.	Complete

Item #	Description	Status
3.2.4.8.A	Electrical Isolation - confirm administrative controls for alignment and operation of the FLEX distribution network will be provided to prevent energizing a bus from multiple sources. Tracked by Open Item #66.	Started
3.2.4.9.A	Completion of fuel consumption rate analyses that calculate the total fuel usage for each piece of FLEX equipment and thus determine if sufficient fuel with margin exists on-site until offsite resources arrive for replenishment. Confirm FLEX equipment total fuel consumption rate.	Complete
3.2.4.9.B	Confirm delivery path to equipment from fuel oil storage tanks and FLEX storage facility.	Complete
3.2.4.10.A	Confirm analysis of consequences from performing DC deep load shed and calculation needed to validate the coping time that will be added to station batteries to provide needed margin to the plant's installed equipment's coping time. Tracked by Open Item #27.	Complete
3.2.4.10.B	The NRC staff concluded that the NEI position paper provides an acceptable approach for licensees to use in demonstrating that vented lead-acid batteries can be credited for durations longer than 8 hours. The licensee was requested if HNP plans to comply with recommendations presented in the Nuclear Energy Institute (NEI) position paper entitled "Battery Life Issue" (ADAMS Accession No. ML13241A186 (position paper))? During the audit process, the licensee stated that HNP intends to comply with the NEI white paper entitled "Battery Life Issue" (ADAMS Accession No. ML13241A186) as endorsed by the NRC (ADAMS Accession No. ML13241A188). The licensee should provide a summary description of how HNP will conform to the NEI position paper. Tracked by Open Item #86.	Complete
3.2.4.10.D	Confirm sizing calculations for the FLEX DGs to show that they can supply the loads assumed in phase 2 and 3.	Complete
3.4.A	Confirm information is provided on how conformance with NEI 12-06, Section 12.2 guidelines 2 through 10 will be met. Tracked by Open Items #66, 71, 72, 73, 74, 75.	Started

7 Potential Draft Safety Evaluation Impacts

The NRC issued the *Shearon Harris Nuclear Power Plant, Unit 1 - Interim Staff Evaluation Relating to the Overall Integrated Plan in Response to Order EA-12-049 (Mitigation Strategies) (TAC No. MF0874)* (Reference 16) on February 12, 2014. The open item and confirmatory open items identified in the Interim Staff Evaluation are addressed in this report. 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 enclosure.

1) Duke Energy Letter, *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, (ADAMS Accession No. ML13112A020)

2) Duke Energy Letter, *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)*, dated August 27, 2013, (ADAMS Accession No. ML13239A359)

3) 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 (ADAMS Accession No. ML12054A735)

4) 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. (ADAMS Accession No. ML12229A174)

5) NEI 12-06, *Diverse and Flexible Coping Strategies (FLEX) Implementation Guide, Revision 0,* dated August 2012 (ADAMS Accession No. ML12242A378)

6) Duke Energy Letter, *Carolina Power & Light Company and Florida Power Corporation'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. ML12307A021)

7) 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 No. ML13241A188)

8) 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)

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 October 3, 2013 (ADAMS Accession No. ML13275A318)

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 October 7, 2013 (ADAMS Accession No. ML13276A224)

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) HNP-C/FLEX-0001, *Tornado Effects on RWST for FLEX NTTF 4.2 Coping Strategies,* Revision 0

13) "Extended Battery Duty Cycles" Position Paper (ADAMS Accession No. ML13241A186)

14) "Shutdown/Refueling Modes" Position Paper (ADAMS Accession No. ML13273A514)

15) "Nuclear Maintenance Application Center: Preventive Maintenance Basis for FLEX Equipment" Position Paper (ADAMS Accession No. ML13276A573)

16) NRC Letter, *Shearon Harris Nuclear Power Plant, Unit 1 – Interim Staff Evaluation Relating to the Overall Integrated Plan in Response to Order EA-12-049 (Mitigation Strategies) (TAC No. MF0874)* dated February 12, 2014 (ML13364A214)

17) Duke Energy Letter, *Second 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),* dated February 27, 2014, (ADAMS Accession No. ML14072A051)

18) Areva Inc., *Regional Response Center Technical Requirements (Document Number 51-9199717-007)* dated January 30, 2014 (Draft)

19) Duke Energy Letter, *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),* dated August 25, 2014, (ADAMS Accession No.ML14241A115)

20) Duke Energy Letter, *Response to March 12, 2012, Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendation of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident, Enclosure 5, Recommendation 9.3, Emergency Preparedness – Staffing, Requested Information Items 1,2, and 6 – Phase 2 Staffing Assessment,* dated November 25, 2014