



R. Michael Glover
H. B. Robinson Steam
Electric Plant Unit 2
Site Vice President

Duke Energy Progress
3581 West Entrance Road
Hartsville, SC 29550

O: 843 857 1704
F: 843 857 1319

Mike.Glover@duke-energy.com

10 CFR 50.4

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

**H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261 / RENEWED LICENSE NO. DPR-23**

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 Licensees With Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events, Revision 0, Dated March 12, 2012, (Agencywide 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. NEI 12-06, *Diverse and Flexible Coping Strategies (FLEX) Implementation Guide*, Revision 0-A, Dated August 2012
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, *Carolina Power And Light Company's 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 26, 2013 (ADAMS Accession No. ML13071A415)

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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, as issued by the NRC, 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, as issued by the NRC, 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 Brunswick, Robinson and Shearon Harris Nuclear Power Plants. Reference 5 provided Duke Energy's OIP for the H. B. Robinson Steam Electric Plant, Unit No. 2.

Reference 1, as issued by the NRC, also required submission of status reports at six-month intervals following the submittal of the OIP. The purpose of this letter is to provide the fourth six-month status report pursuant to Section IV, Condition C.2, of Reference 1. The attached report provides an update of milestone accomplishments since the last status report, including any changes to the compliance method, schedule, or need for relief and the basis, if any.

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

Should you have any questions regarding this submittal, please contact Mr. Richard Hightower, Manager, Nuclear Regulatory Affairs at (843) 857-1329.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on 2/23/2015.

Sincerely,



R. Michael Glover
Site Vice President

RMG/shc

Enclosure: 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)

cc: Ms. M. C. Barillas, NRC Project Manager, NRR
Mr. K. M. Ellis, NRC Sr. Resident Inspector
Mr. V. M. McCree, NRC Region II Administrator

ENCLOSURE

H. B. Robinson Steam Electric Plant, Unit No. 2

Docket No. 50-261

Renewed License No. DPR-23

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)

H. B. Robinson Fourth Six-Month Status Report

1 Introduction

H. B. Robinson Steam Electric Plant, Unit No. 2 developed an Overall Integrated Plan (OIP) (Reference 1), documenting the diverse and flexible strategies (FLEX), in response to NRC Order EA-12-049 (Reference 2). The Overall Integrated Plan was submitted to the NRC on February 26, 2013. This enclosure provides an update of milestone accomplishments including any changes to the compliance method, schedule, or need for relief/relaxation and the basis, if any, that occurred during the period from July 29, 2014 to January 30, 2015 (hereafter referred to as "the update period"). This update is based on an approved formal Engineering Change-Evaluation (88926R4) (Reference 6) that is discipline reviewed and design verified.

2 Milestone Accomplishments

The following milestone(s) have been completed since the development of the Overall Integrated Plan (Reference 1), and are current as of January 30, 2015:

- Complete Strategy Development
- Submit Integrated Plan
- Complete Modification Identification
- Submit First 6-month Status Update
- Submit Second 6-month Status Update
- Submit Third 6-month Status Update
- Complete Staffing Assessment

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 do not impact the order implementation date.

Milestone	Target Completion Date	Activity Status	Revised Target Completion Date
Complete Strategy Development	February 2013	Complete	Date Not Revised
Submit Integrated Plan	February 2013	Complete	Date Not Revised

Milestone	Target Completion Date	Activity Status	Revised Target Completion Date
Submit 6-month Status Update	August 2013	Complete	Date Not Revised
	February 2014	Complete	Date Not Revised
	August 2014	Complete	Date Not Revised
	February 2015	Started	Date Not Revised
Complete Modification Identification	March 2013	Complete	Date Not Revised
Complete Modification Development	February 2015	Started	Date Not Revised
Complete Equipment Procurement	February 2015	Started	Date Not Revised
Complete Equipment PM Development	February 2015	Started	Date Not Revised
Complete FSG Development	May 2015	Started	Date is Revised
Issue FSGs	June 2015	Not Started	Date is Revised
Complete Training Development	March 2015	Started	Date Not Revised
Initiate Training Implementation	May 2014	Started	Date Not Revised
Complete Training	May 2015	Started	Date Not Revised
Complete Staffing Assessment	November 2014	Complete	Date Not Revised
Issue Regional Response Center Playbook for RNP	May 2015	Started	Date Not Revised
Complete Communications Integrated Plan	April 2015	Started	Date Revised
Complete Online Modification Implementation	May 2015	Started	Date Not Revised
Complete Outage Modification Implementation (R229)	June 2015	Started	Date Not Revised
RNP FLEX Implementation Complete	June 2015	Not Started	Date Not Revised

4 Changes to Compliance Method

The following summarizes the changes to the strategies as documented in the Overall Integrated Plan (Reference 1) that were made during the update period. These changes do not impact RNP compliance with NEI 12-06.

1) Change:

NRC letter dated February 19, 2014, Interim Staff Evaluation Regarding Overall Integrated Plan In Response To Order EA-12-049, listed Open Item 3.2.4.8.A which stated:

The strategy to use a pre-staged portable diesel generator to supply ac power directly to the vital battery chargers is an alternative approach for satisfying the Mitigating Strategies Order, which relies primarily on portable equipment. Verify that this strategy provides the equivalent level of flexibility for responding to an undefined event as would be achieved through conformance with the endorsed guidance of NEI 12-06.

The FLEX Diesel Generators are permanently Pre-Staged in the Reactor Auxiliary Building Drumming Room, and as such are not portable. The Interim Staff Evaluation stated that the pre-staging of the FLEX DGs is an alternative approach to NEI 12-06, which describes the use of portable equipment.

Update:

H. B. Robinson acknowledged the alternative approach for satisfying the Mitigating Strategies Order in the response to NRC Open Item 3.2.4.8.A which was posted to the Robinson ePortal in a Folder titled RESPONSE TO NRC STAFF OPEN ITEM 3.2.4.8.A CLARIFICATION FOR H. B. ROBINSON NUCLEAR PLANT, UNIT 2 MITIGATION STRATEGIES INTEGRATED PLAN, Phase 2 Electrical Strategy, Revision 1.

Justification:

The use of pre-staged FLEX DGs allows re-energizing the 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. This mitigation strategy constitutes an alternative approach to NEI 12-06 guidance and is acceptable because the FLEX DGs are stored in a robust structure designed to adequately withstand all external events that has an access path that will be clear after the initiating event. Although the pre-staged FLEX DGs are not portable as discussed in NEI 12-06, the overall strategy has advantages that outweigh the lack of portability of the FLEX DGs. The FLEX DGs 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 over other strategies that were evaluated. The strategy also minimizes risk by utilizing robust equipment that is located within a robust 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 alternative strategy.

Documentation:

- EC EVAL 88926 Rev. 4, FLEX Strategies and Implementation Plan (Reference 6)

2) Change:

The RNP Overall Integrated Plan dated February 26, 2013 (Reference 1), Item 7 described the following strategy for reactor core cooling and heat removal with the SGs unavailable in Modes 5 and 6:

The primary strategy to supply power to the charging pumps is by energizing 480V switchgear E1 or E2. The switchgear will be powered by modifying the current 480V switchgear E1 or E2 to include connection points near the existing diesel generator that will be capable of switching between the existing diesel generator power feeds and the portable FLEX generator power feeds, (Open Item 26). If E1 or E2 are unavailable, the secondary method will entail utilizing a manual transfer switch with portable generator connections that will be installed for a charging pump, (Open Item 27). The source of water for the charging pumps is the RWST. Currently, the RWST is seismically qualified, but is not protected from wind or missiles. The RWST will be hardened to protect against these hazards, (Open Item 41).

Update:

The RNP First Six-Month Status Report dated August 28, 2013 described changes to this strategy that are still feasible and valid. A refinement to the strategy is to use the Spent Fuel Pool (SFP) as a possible borated water source for RCS makeup and cooling in Modes 5 and 6 via an Emergency Cooling Connection (ECC) in the SFP Cooling System and deliver through pre-staged connections in the safety injection lines using a portable pumper. Installation of the FLEX connections will be controlled using the shutdown risk management process as described in the Shutdown Modes Position Paper endorsed by the NRC.

The RWST remains a viable seismically protected source of borated water, but will not be protected against the RNP high wind and missile hazard as noted in the same item of the First Six-Month Status Report. Open Item 41 has been deleted.

Justification:

The SFP is a viable source of borated water and can be replenished using existing SFP makeup strategies (EDMG-011, SFP Casualty (Reference 12)) and manual addition of boric acid to the SFP. Calculations in EC95216 can be extrapolated to show that the addition of approximately 100 lbs. of boric acid per 1000 gallons of SFP makeup is sufficient to maintain shutdown margin in the SFP and the RCS. The SFP contains approximately 615 gallons of borated water per inch of level (OP-910, Spent Fuel Pit Cooling And Purification System (Reference 13)), with at least 4 feet of water available above the ECC connection suction source, or a usable volume of 29,520 gallons. The SFP Transfer canal has a normal volume of 40,753 gallons. Injection flow to remove decay heat is less than 150 gpm when the RCS is in a reduced inventory vented condition.

Documentation:

- EC EVAL 88926 Rev. 4, FLEX Strategies and Implementation Plan (Reference 6)
- EDMG-011, Spent Fuel Pool Casualty, Rev. 14 (Reference 12)
- OP-910, Spent Fuel Pit Cooling And Purification System (Reference 13)

3) Change:

As a result of the NTTF 2.3 Seismic Hazard Re-Evaluation, RNP has taken action to stage an additional AFW strategy.

Update:

Two portable pumps have been procured, each capable of 300 gpm at 1000 psig; this combination eliminates the need to depressurize the SGs in the event the backup AFW feed capability is needed due to an AFW interruption early in the ELAP transient resulting from a seismic event. The strategy is designed to provide a minimum of 900 psi at 240 gpm for a minimum of 8 hours following a beyond design basis seismic event; 6 hours for ERO to arrive and 2 hours for ERO to align other water source(s). The alternate source of feedwater is stored in six 20,000 gallon tanks aligned to the suction of the two pumps. Four additional 20,000 gallon tanks are staged at the lake front.

Justification:

Engineering Change 95263, Fukushima AFW, provides an alternate source of Feedwater to the Steam Generators via a new high pressure pump skid and a new source of water in response to Fukushima Seismic concern for a beyond design basis seismic event.

Documentation:

- EC EVAL 88926 Rev. 4, FLEX Strategies and Implementation Plan (Reference 6)
- EC 95263, Fukushima AFW (Reference 14)

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

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

6 Open Items

RNP Duke Energy confirms that the FLEX strategy station battery run-time was calculated in accordance with the IEEE-485 methodology using manufacturer discharge test data applicable to the licensee's FLEX strategy as outlined in the NEI white paper on Extended Battery Duty Cycles (Ref 8). This Generic Open Item is complete and was included in the RNP Second Six-Month Status Report (Ref 3).

The Electric Power Research Institute (EPRI) Report 3002000623 entitled "Nuclear Maintenance Applications Center: Preventive Maintenance Basis for FLEX Equipment," (Ref 9) continues to be evaluated by RNP Duke Energy. This is Open Item 93 in Section 6.a of this report.

RNP Duke Energy 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) (Ref 10) with clarifications. This was identified as Open Item 3.2.1.8.B in the ISE. The Open Item has been dispositioned and the RNP response is uploaded to the Robinson ePortal.

RNP 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 (Ref 11). This is Open Item 143 in Section 6.b of this report.

The MAAP4 and CENTS computer code Generic Open items do not apply to RNP.

The following tables provide a summary status of the Open Items. The table under Section 6.a. provides the open items that were previously identified in the original OIP submitted on February 28, 2013 and in the first, second, and third six-month status reports submitted by (Ref 1, 2, 3, 4). The table under Section 6.b. provides a list of open items that were added after July 30, 2014.

- a. Open Items Documented in Overall Integrated Plan and in first and second six-month update.

Item #	Open Item Description	Status
1.	A Regional Response Centers (RRC) playbook will be developed to support RNP during beyond design basis events.	Started
2.	Figure(s) (site plot plan) showing FLEX equipment storage locations and deployment routes will be provided.	Complete
3.	Deployment strategies will be incorporated into an administrative program.	Not Started
4.	RNP will implement the programmatic controls in accordance with NEI 12-06.	Started

Item #	Open Item Description	Status
5.	Equipment associated with these 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
6.	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.	Started
7.	Programs and processes will be established to ensure personnel proficiency in the mitigation of beyond-design-basis events as developed and maintained in accordance with NEI 12-06, Section 11.6.	Started
8.	The FLEX strategies and basis will be maintained in overall FLEX basis documents.	Started
9.	Existing plant configuration control procedures 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
10.	Applicable training initiated through the Systematic Approach to Training (SAT) process will be completed prior to the implementation of FLEX.	Started
16.	A seismically qualified pressure source capable of supplying SG PORV operation will be installed.	Strategy Deleted
17.	Site-specific procedures and/or FSGs will be developed using industry guidance to address the criteria in NEI 12-06, Section 11.4.	Started
18.	A portable pump will be procured and pre-staged near the condensate pump area.	Pre-staging Strategy Deleted
20.	Valve C-66 to be modified to include FLEX connections.	Started
22.	A tee-connection will be added to the C AFW Pump discharge.	Complete
23.	Sufficient nitrogen tanks (for SG PORV) for a 24 hour coping duration will be relocated to a protected location.	Started
24.	The existing connection point for the portable nitrogen tank will be modified to include quick-connects.	Strategy Deleted
25.	The SI accumulator isolation valves will be re-powered via switchgear E1 or E2 with portable diesel generators.	Started

Item #	Open Item Description	Status
26.	Modify the current 480V switchgear E1 or E2 and existing diesel generator s to include portable diesel generator connection points capable of switching between the existing diesel generator power feeds and portable FLEX generator power feeds.	Started
28.	To provide primary and alternate connections for portable pumps, an alternate mechanical tee-connection will be provided.	Started
29.	Mechanical connections will be available for the south and north SW headers to allow connection of a portable pump.	Started
30.	N+1 portable pumps will be procured and stored in a robust structure in a protected location near the intake structure in support of Item 29 above.	Pre- staging Strategy Deleted
31.	During Modes 5 and 6, a portable pump will be used to take suction from the RWST or SFP or portable tanker and discharge to the SI header.	Started
32.	Primary and alternate mechanical FLEX connections will be added to the SI header.	Started
33.	Drain valve (SI-837) at the base of the RWST will be modified to align it to the standardized connection type.	Started
34.	Structures to provide protection of the FLEX equipment will be built prior to the FLEX implementation date.	Started
35.	The RNP procedures and programs must be developed to address storage structure requirements, deployment path requirements, and FLEX equipment requirements relative to the hazards applicable to RNP.	Not Started
36.	Necessary modifications will be made to existing SSC connections to facilitate FLEX equipment deployment.	Strategy Deleted
37.	Necessary modifications will be made to existing onsite fences, structures or security parameters to facilitate flex equipment deployment.	Strategy Deleted
38.	The equipment connection points will be designed to withstand the applicable external hazards.	Strategy Deleted
39.	The means for connecting the Phase 3 generator will be identified based on the selected onsite location of the generator.	Strategy Deleted
40.	Low leakage Reactor Coolant Pump (RCP) seals will be installed.	Started
42.	Actual size of generator to be determined at a later time.	Complete

Item #	Open Item Description	Status
43.	A containment over-pressure and over-temperature analysis will be performed.	Complete
44.	The resolution of method for SFP level determination is being addressed by the actions taken in response to Order 12-051.	Started
45.	To maintain SFP inventory, a portable pump equipped with suction and discharge lines and compatible hose connections will be available.	Strategy Deleted
46.	The alternate strategy for SFP cooling is to provide makeup via installed SFP piping which will require modifications. One of two Emergency Cooling Connections (ECCs) can be used for external filling to robust piping. These connections will be used with portable pumps to draw water from diverse locations directly into the pool. This change was reported in the Second Six-Month Update.	Started
47.	Alternate methods for powering the 480V MCC 5 and 6 require either bus modification to accommodate the diesel generator connector, or the addition of a new diesel generator connection integrated into vertical panel design.	Strategy Deleted
50.	Applicable areas of the Turbine Building will be analyzed or hardened to provide an adequate level of assurance of critical instrumentation availability.	Started
51.	Calculations will be performed for extending the time before HVAC is needed to beyond eight hours.	Started
53.	Additional portable lighting will be procured to facilitate implementation of the FLEX strategies.	Started
54.	Strategies to mitigate the loss of communications systems will be developed per NEI 12-06 Section 3.2.2(8).	Started
55.	Staffing studies will be performed in accordance with NRC RFI and NEI 12-01 to ensure adequate staffing is available to support, install, and operate FLEX equipment in the time necessary.	Complete
56.	Phase 2 battery coping will require portable diesel generators to power the battery chargers and the Battery Room exhaust fans in order to remove hydrogen gas accumulation during charging.	Complete
57.	Manual disconnect switches, compatible for quick portable diesel generator connection, will be installed to directly power the battery chargers.	Started
58.	Permanent cable and raceway will be installed to make cable deployment directly to the battery chargers feasible.	Strategy Deleted
60.	Manual transfer switches with the ability to quick-connect to portable 5kW diesel generators will be installed to provide ventilation to the Battery Rooms.	Strategy Deleted

Item #	Open Item Description	Status
61.	An analysis of HVAC requirements for operating equipment will be performed based on area heat-up times without cooling available for indefinite coping.	Started
62.	Portable fan blowers/generators will be procured and used to provide forced convection.	Complete
63.	RNP will acquire a fuel pumping vehicle/trailer that can be used to extract and deliver fuel oil.	Complete
64.	An analysis to determine the fuel consumption rate of all portable generators/equipment will be performed.	Complete
65.	Provisions will be made for an offsite fuel delivery to RNP before all onsite fuel is depleted.	Complete
66.	Results of the PWROG task will be used in determining the minimum flow rate and pumping capacity required for borated water makeup.	Complete
67.	Portable equipment maintenance will be performed in accordance with the requirements of NEI 12-06, Section 11.5.	Not Started
68.	An analysis will be performed to determine the radiation protection equipment requirements.	Complete
69.	An analysis will be performed to determine the commodities requirements.	Complete
70.	Transportation equipment will be provided to move large skid/trailer mounted equipment provided from off-site.	Complete
71.	Additional or revised conceptual sketches will be provided in future updates as engineering packages mature from conceptual design to final design.	Complete
72.	Develop procedures, references, and tables to determine key parameters using a portable DVM in the instrument racks.	Complete
73.	Order EA-12-049, requires that status reports be submitted on six month intervals, following the submittal of the Overall Integrated Plan, until compliance is achieved. Provide the six month status report to licensing for processing.	Complete
74.	Implement the RNP integrated plan for Order EA-12-049 as stated in the submittal. If plans change, ensure that the changes are reflected in future six month status reports that are required to be submitted per the Order. Ensure Open Items listed in RNP-RA/13-0022 (i.e., 588978), are addressed.	Started
79.	<p>Revise SAMG and other RNP Emergency procedures to include FLEX response and related setpoints.</p> <p>Note: This activity / scope does not include revision of other site procedures as they will be revised as part of the mods that impact them. Mod estimates include budget for associated procedure revisions.</p>	Started

Item #	Open Item Description	Status
80.	FI-6416 installed per EC83801 is a safety related instrument and is currently used in DSP-002, "Hot Shutdown Using the Dedicated/Alternate Shutdown System" Attachment 6. Ensure use of this instrument is accounted for in the new FSGs.	Started
81.	Ensure no credited SBO circuits are removed from operation when determining which additional loads can be shed for a deep load shedding strategy. Refer to 8S19-P-101, Station Blackout Coping Analysis Report, Table 1 for credited SBO equipment.	Complete
82.	When new load shedding strategies are developed, perform manual action walk-throughs and validation (simulated) to demonstrate the proposed operator actions are feasible and achievable.	Started
86.	Re-evaluate SI Accumulator Isolation Valve closure as a phase 2 strategy (determine how to get power to the valves by possibly using the battery charger diesel generators.	Complete
87.	Loss of heat tracing on significant required instrumentation sensing lines has been identified. The heat tracing is not safety related and it is not robust. Develop strategies to address the loss of heat tracing on instrument sensing lines.	Started
88.	Verify that AC power is not required for access to all areas of the plant in an ELAP event.	Complete
89.	Develop an ELAP boration strategy that includes rates, times, and SDM calculations for all times in core life.	Complete
90.	Develop a one-line electrical sketch of the RNP battery bus power scheme showing connections for the FLEX portable equipment to be used in an ELAP event.	Complete
91.	Describe how electrical isolation will be maintained such that (a) Class 1E equipment is protected from faults in portable/FLEX equipment and (b) multiple sources do not attempt to power electrical buses.	Started
92.	Develop a formal strategy for refueling of all FLEX portable equipment during an ELAP event. Explain how fuel quality will be assured if it stored for extended periods of time. See Open Item 64 also. Include the strategy in FSG-005.	Complete
93.	Provide details in the OIP of how RNP will incorporate the EPRI industry program for maintenance and testing of FLEX electrical equipment such as batteries, cables, and diesel generators.	Not Started
94.	<p>Discuss the reliability of the SDAFWP with respect to the following:</p> <ul style="list-style-type: none"> • The steam traps are all ganged into one line to the condenser that has the potential to be pinched or crimped in an event and render the SDAFWP 	Not Started

Item #	Open Item Description	Status
	<p>inoperable.</p> <ul style="list-style-type: none"> • The SDAFWP miniflow recirculation line has the same exposure to being pinched or crimped in an event and render the SDAFWP inoperable. 	
95.	<p>Evaluate the SG PORVs for an Uncontrolled Cooldown scenario as follows:</p> <p>(a) Clarify whether the ADV or upstream associated piping is a safety-related system, protected from external events such as tornadoes. If not, address the following questions:</p> <p>(b) Clarify whether damage to an ADV or upstream associated piping could occur during an ELAP that would result in an uncontrolled cooldown of the reactor coolant system and provide a basis for the response.</p> <p>(c) Clarify whether postulated damage would be limited to a single ADV and/or associated piping, or whether failures could be postulated resulting in an uncontrolled cooldown affecting both steam generators, and provide a basis for the response.</p> <p>(d) If ELAP scenarios involving the uncontrolled cooldown of one or more steam generators may be postulated, describe key operator actions that would be taken to mitigate these events.</p> <p>(e) If ELAP scenarios involving the uncontrolled cooldown of one or more steam generators may be postulated, provide analysis demonstrating that the intended mitigating actions would lead to satisfaction of the requirements of Order EA-12-049 for these cases.</p> <p>(f) As applicable, if the operator actions to mitigate an ELAP event involving an uncontrolled cooldown results in an asymmetric cooldown of the reactor coolant system, address the consequences of the asymmetric cooldown on the mixing of boric acid that is added to the reactor coolant system to ensure sub-criticality.</p>	Complete
96.	<p>The issue of how to control critical equipment without control power must be assessed as part of the response to load shedding.</p>	Started
97.	<p>Purchase portable gas or propane heaters to replace the 480 VAC heaters used for freeze protection in cold weather operations. The portable heaters will be stored in the FLEX storage facility.</p>	Strategy Deleted
98.	<p>Provide documentation of high wind and missile protection for the components associated with EC94741.</p>	Not Started
99.	<p>Procure a diesel driven sump pump to dewater the Intake SW Strainer Pit following a rain event.</p>	Strategy Deleted
100.	<p>Evaluate the Rad Waste building to determine if it is robust against the high wind and missile hazard.</p>	Complete

Item #	Open Item Description	Status
101.	Develop a formal calculation to determine the time to boil off the SFP inventory to 10' above the fuel racks and to the top of the fuel racks assuming: <ul style="list-style-type: none"> • 1/3 Core Offload 100 hours after refueling Mode 6 Full Core Offload	Complete
102.	Evaluate the Lake Robinson dam to determine if it is robust against the high wind and missile hazard.	Complete
103.	Determine if it is required to store HazMat equipment in the FLEX storage facility to cope with an acid or caustic tank rupture/spill.	Complete
104.	Perform walkdowns and simulations to verify and validate that time critical actions required for mitigating strategies for core cooling are feasible.	Not Started
105.	Perform walkdowns and simulations to verify and validate that time critical actions required for mitigating strategies for RCS boration and inventory are feasible.	Not Started
106.	Perform walkdowns and simulations to verify and validate that time critical actions required for mitigating strategies for SFP cooling are feasible.	Complete
107.	Revise drawing Z25R2 to specify all 'A' staging areas, deployment routes from storage to staging, equipment to be staged in each area, and distance to the related FLEX connection points.	Complete
108.	Add a section to the FLEX/Fukushima Program document to list all SSCs affected by FLEX implementation. See EC 88926, Rev. 2, Design Verification Comment #81.	Not Started
109.	Determine which of the following instruments located in the Turbine Class 1 Bay are critical to FLEX response strategies for core cooling. <p>Secondary Control Panel on the mezzanine</p> LI-607A-2 LI-607B-2 LI-607C-2 LI-607D-2 PI-607E-2 LI-1454C TI-410B TI-413B <p>Instruments, LI-477A, 487A and 497A on the mezzanine</p> <p>Instrument FI-6416 on the mezzanine</p> <p>Main Steam Line Pressure transmitters Cabinet on the mezzanine</p> PT-474 PT-475 PT-484 PT-485 PT-495 PT-496 Ensure critical instruments are included in EC 90627 before the 30% Design Review.	Complete

- b. Open Items added after January 28, 2014. This table includes Open and Confirmatory Items that were identified in the NRC Interim Staff Evaluation and Audit Report (Reference 7). Items with a status of Complete are posted on the H. B. Robinson ePortal.

Item #	New Open, ISE Open, and Confirmatory Items	Status
110.	<p>Open Item 3.2.1.8.B</p> <p>Core Sub-Criticality - Verify that RNP will apply the generic resolution for boron mixing under natural circulation conditions potentially involving two-phase flow, in accordance with the PWROG position paper, dated August 15, 2013, subject to the additional conditions provided in the NRC endorsement letter dated January 8, 2014; or alternatively, justify the boric acid mixing assumptions that will ensure adequate shutdown margin exists through all 3 phases of an ELAP event.</p>	Complete
111.	<p>Open Item 3.2.4.8.A</p> <p>The strategy to use a pre-staged portable diesel generator to supply ac power directly to the vital battery chargers is an alternative approach for satisfying the Mitigating Strategies Order, which relies primarily on portable equipment. Verify that this strategy provides the equivalent level of flexibility for responding to an undefined event as would be achieved through conformance with the endorsed guidance of NEI 12-06.</p>	Complete
112.	<p>Confirmatory Item 3.1.1.1.A</p> <p>Confirm that the final design of the FLEX equipment storage building and location ensures that FLEX equipment such as pumps and power supplies will be secured, and that stored equipment and structures will be protected from seismic interactions, high wind events, and extreme temperature conditions.</p>	Complete
113.	<p>Confirmatory Item 3.1.1.2.A</p> <p>Confirm that the vehicles and equipment provided for debris removal will be protected from seismic events.</p>	Complete
114.	<p>Confirmatory Item 3.1.1.2.B.1</p> <p>Confirm that all site travel paths and deployment routes for FLEX equipment have been analyzed to ensure survivability following a seismic event.</p>	Started
115.	<p>Confirmatory Item 3.1.1.2.B.2</p> <p>Confirm that the deployment strategies for FLEX equipment ensure that connection points are protected and that key areas are accessible through seismically robust structures following a seismic event.</p>	Started
116.	<p>Confirmatory Item 3.1.1.3.A</p> <p>Confirm that guidance will be made available to operators on critical actions to perform while establishing alternate indication for key instruments and on how to control critical equipment without control power.</p>	Started
117.	<p>Confirmatory Item 3.1.1.4.A</p> <p>Off-Site Resources - Confirm the identification of the local staging area, the evaluation of access routes, and the method of transportation to the site for the RRC provided equipment.</p>	Complete

Item #	New Open, ISE Open, and Confirmatory Items	Status
118.	<p>Confirmatory Item 3.1.5.2.A</p> <p>Confirm that potential problems with door access, such as sheet metal expansion or swollen door seals due to high temperature conditions, will be mitigated.</p>	Complete
119.	<p>Confirmatory Item 3.2.1.A</p> <p>Confirm that the generic ELAP analyses 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," (ADAMS Accession Nos. ML 13042A011 and ML 13042A013, non-public), are applicable to RNP, and specifically, that the important parameters and assumptions used are representative and appropriate for simulating the ELAP transient.</p>	Complete
120.	<p>Confirmatory Item 3.2.1.B</p> <p>Confirm that the RNP FLEX mitigation strategies address each of the 7 PWROG recommendations listed in Section 3.2 of WCAP-17601-P. This information should include the rationale for whether each issue is applicable to the plant, how the applicable recommendations have been considered in the ELAP coping analysis, and how they will be implemented in the RNP mitigating strategies.</p>	Complete
121.	<p>Confirmatory Item 3.2.1.C</p> <p>Confirm that the SG PORVs will be provided with motive force and adequately protected from hazards so that they can function as required for the RNP mitigating strategies.</p>	Complete
122.	<p>Confirmatory Item 3.2.1.E</p> <p>Confirm that the configurations of the SDAFW pump steam traps and mini-flow recirculation line are such that the pump will not be rendered inoperable if the lines are damaged.</p>	Not Started
123.	<p>Confirmatory Item 3.2.1.1.A</p> <p>Confirm that the application of the NOTRUMP code for the ELAP analysis for RNP is limited to the flow conditions prior to reflux condensation initiation. This includes specifying an acceptable definition for reflux condensation cooling.</p>	Complete
124.	<p>Confirmatory Item 3.2.1.2.A</p> <p>Confirm that the impacts of the Westinghouse 10 CFR Part 21 report, "Notification of the Potential Existence of Defects Pursuant to 10 CFR Part 21," dated July 26, 2013 (ADAMS Accession No. ML 13211A168) on the use of the low seal leakage rate have been addressed in the ELAP analysis for RNP. (Note: The TER, on page 27 of 60, listed an incorrect ADAMS accession number for the August 16, 2013, PWROG position paper on RCP seal leakage; it should be ML 13235A 151).</p>	Complete
125.	<p>Confirmatory Item 3.2.1.2.B</p> <p>If the RCP seals are changed to the newly designed Generation 3 SHIELD seals or non-Westinghouse seals, confirm that acceptable justification is provided for the seal leakage rates used in the revised ELAP analysis for RNP.</p>	Complete
126.	<p>Confirmatory Item 3.2.1.3.A</p> <p>Confirm that appropriate methods and assumptions are used in the decay heat calculations for RNP for an ELAP event. This should include justification for the model and the values used for the key parameters.</p>	Complete

Item #	New Open, ISE Open, and Confirmatory Items	Status
127.	<p>Confirmatory Item 3.2.1.6.A</p> <p>Confirm that the revised analyses for makeup rates, boration strategies, and core cooling times based on the use of low leakage RCP seals are adequately justified and appropriately reflected in the sequence of events timeline.</p>	Complete
128.	<p>Confirmatory Item 3.2.1.6.B</p> <p>Confirm that the revised safety injection accumulator isolation strategy will ensure timely isolation to prevent nitrogen injection into the RCS.</p>	Complete
129.	<p>Confirmatory Item 3.2.1.8.A</p> <p>Confirm that the revised boration strategies ensure that acceptable shutdown margin will be maintained throughout all phases of an ELAP event.</p>	Complete
130.	<p>Confirmatory Item 3.2.1.9.A</p> <p>Confirm that the design requirements and supporting analyses for the portable FLEX pumps show that they are capable of performing their respective functions as credited in the mitigating strategies.</p>	Started
131.	<p>Confirmatory Item 3.2.3.A</p> <p>Confirm that the RNP strategies for maintaining containment are consistent with the containment pressure and temperature analysis for all 3 phases of an ELAP event.</p>	Complete
132.	<p>Confirmatory Item 3.2.4.1.A</p> <p>Confirm that cooling water will be supplied, as needed, to plant equipment credited to perform a mitigation strategies function under ELAP conditions.</p>	Complete
133.	<p>Confirmatory Item 3.2.4.2.A</p> <p>Confirm that actions necessary to ensure equipment functionality and personnel habitability during an ELAP event are appropriately incorporated into the FLEX strategies, based on the analyses of the impact of high temperatures on various areas/compartments (main control room, battery room, SDAFW pump room).</p>	Started
134.	<p>Confirmatory Item 3.2.4.2.B</p> <p>Confirm that adequate ventilation is provided to the battery rooms to prevent unacceptable levels of hydrogen accumulation.</p>	Started
135.	<p>Confirmatory Item 3.2.4.2.B</p> <p>Confirm that appropriate actions are implemented to address the loss of heat tracing on instrument lines under ELAP conditions.</p>	Started
136.	<p>Confirmatory Item 3.2.4.4.A</p> <p>The NRC staff has reviewed the licensee communications assessment (ADAMS Accession Nos. ML 12311A299 and ML 13058A045) and has determined that the assessment is reasonable (ADAMS Accession No. ML 13105A413). Confirm that upgrades to the site's communications systems have been completed.</p>	Started
137.	<p>Confirmatory Item 3.2.4.7.A</p> <p>Confirm that alternate sources of cooling water, such as Lake Robinson or the discharge canal, have been evaluated for the potential impacts of reduced water quality, and that actions to address water quality have been developed, as needed to ensure the successful implementation of the RNP mitigating strategies.</p>	Complete

Item #	New Open, ISE Open, and Confirmatory Items	Status
138.	<p>Confirmatory Item 3.2.4.9.A</p> <p>Confirm that the methods and sources for refueling the FLEX equipment are consistent with the analyzed fuel consumption rates of all portable generators and pumping equipment.</p>	Complete
139.	<p>Confirmatory Item 3.2.4.10.A</p> <p>Confirm the sizing calculations for the FLEX DGs to show that they can supply the loads assumed in Phases 2 and 3.</p>	Complete
140.	<p>Confirmatory Item 3.2.4.10.B</p> <p>Confirm that the ELAP load shed analysis has adequately accounted for the loss of functions and has addressed any impacts on defense in depth and redundancy.</p>	Complete
141.	<p>Confirmatory Item 3.3.1.A</p> <p>Confirm that the licensee's implementation of maintenance and testing guidance for FLEX equipment conforms to the generic approach endorsed by the staff, or constitutes an acceptable alternate approach. The generic approach is provided in the EPRI technical report on preventive maintenance of FLEX equipment, submitted by NEI by letter dated October 3, 2013 (ADAMS Accession No. ML 13276A573). The NRC staff's endorsement letter is dated October 7, 2013 (ADAMS Accession No. ML 13276A224).</p>	Not Started
142.	<p>Confirmatory Item 3.4.A</p> <p>Confirm that NEI 12-06, Section 12.2, guidelines 2 through 10, regarding minimum capabilities for offsite resources, have been adequately addressed.</p>	Complete
143.	<p>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.</p>	Started
144.	<p>Incorporate the SG cooldown MSIV bypass strategy (EPP-1, Attachment 4) into the new ECA-0.0 (ELAP) or an FSG.</p>	Not Started

c. Open Items added after July 30, 2014. This table includes New Open Items that were identified during the implementation process.

Item #	New Open Items	Status
145.	Develop a Final Implementation Plan. This is a formal NRC submittal due 60 days after FLEX implementation is declared at RNP. Include a cross-reference matrix of each strategy, required N+1 equipment, primary and alternate connections, NEI 12-06 requirements, related ECs, and other related information for the final implementation plan.	Not Started
146.	Complete the owners review of the calculations performed under Westinghouse/Duke contract no. 696451.	Started
147.	Revision 4 of EC88926 should include the following assumptions: <ul style="list-style-type: none"> • assumed CST level at T=0 for an ELAP event is 90% (normal level at power based on chemistry concerns) • minimum level prior to implementing FSGs to access alternate coolant sources is 20% per EC94474. 	Complete
148.	Determine if External Containment Cooling (spraying the containment dome) is a feasible containment cooling strategy.	Complete
149.	Submit a report to the NRC describing full compliance with the EA-12-049 Order within 60 days of implementation. Implementation is scheduled for RO229 prior to entering Mode 4 on unit startup. The report should be formatted according to the NEI template in effect at the time of implementation.	Not Started

7. References

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

1. Duke Energy Letter, Carolina Power and Light Company's 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 26, 2013 (ADAMS Accession No. ML13071A415).
2. Duke Energy Letter, H. B. Robinson Steam Electric Plant, Unit No. 2, 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 28, 2013 (ADAMS Accession No. ML13252A243).
3. Duke Energy Letter, H. B. Robinson Steam Electric Plant, Unit No. 2, 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 24, 2014 (ADAMS Accession No. ML14063A283)
4. Duke Energy Letter, H. B. Robinson Steam Electric Plant, Unit No. 2, 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 26, 2014 (ADAMS Accession No. ML14253A161)
5. 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).
6. EC EVAL 88926 Rev. 4, FLEX Strategies and Implementation Plan
7. H.B. Robinson Steam Electric Plant, Unit 2 -Interim Staff Evaluation Regarding Overall Integrated Plan In Response To Order EA-12-049 (Mitigation Strategies) (TAC NO. MF0720), dated 2/19/14 (ADAMS Accession No. ML13365A291).
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 16, 2013, (ADAMS Accession No. ML13241A188)
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 7, 2013, (ADAMS Accession No. ML13276A224)
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, dated January 8, 2014, (ADAMS Accession No. ML13276A183)
11. NRC letter from Jack R. Davis, Director Mitigating Strategies Directorate Office of Nuclear Reactor Regulation, to Nuclear Energy Institute, Mr. Joseph E. Pollock, Vice President Nuclear Operations, dated September 30, 2013, (ADAMS Accession No. ML13267A382)

12. EDMG-011, Spent Fuel Pool Casualty
13. OP-910, Spent Fuel Pit Cooling And Purification System
14. EC 95263, Fukushima AFW