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Serial: BSEP 15-0008

U.S. Nuclear Regulatory Commission
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Subject: Brunswick Steam Electric Plant, Unit Nos. 1 and 2
Renewed Facility Operating License Nos. DPR-71 and DPR-62
Docket Nos. 50-325 and 50-324
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, *Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events*, dated March 12, 2012, Agencywide Documents Access and Management System (ADAMS) Accession Number 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 Number ML12229A174
3. NEI 12-06, *Diverse and Flexible Coping Strategies (FLEX) Implementation Guide*, Revision 0, dated August 2012, ADAMS Accession Number ML12242A378
4. 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 Number EA-12-049)*, dated October 29, 2012, ADAMS Accession Number 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 Number ML13071A559
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 20, 2013, ADAMS Accession Number ML13248A447

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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 28, 2014, ADAMS Accession Number ML14073A451
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 28, 2014, ADAMS Accession Number ML14254A176

Ladies and Gentlemen:

On March 12, 2012, the Nuclear Regulatory Commission (NRC) issued Order EA-12-049 (i.e., Reference 1) to Duke Energy. Reference 1 was immediately effective and directs Duke Energy to develop, implement, and maintain guidance and strategies to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities in the event of a beyond-design-basis external event. Specific requirements are outlined in Attachment 2 of Reference 1.

Reference 1 required submission of an initial status report 60 days following issuance of the final interim staff guidance (i.e., Reference 2) and an Overall Integrated Plan (OIP) pursuant to Section IV, Condition C. Reference 2 endorses industry guidance document NEI 12-06, Revision 0 (i.e., Reference 3) with clarifications and exceptions identified in Reference 2. Reference 4 provided the initial status report regarding mitigation strategies at the Brunswick, Robinson, and Shearon Harris Nuclear Power Plants. Reference 5 provided the OIP for the Brunswick Steam Electric Plant (BSEP), Unit Nos. 1 and 2.

Reference 1 requires submission of a status report at six-month intervals following submittal of the OIP. 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 BSEP.

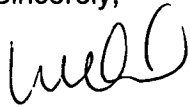
The purpose of this letter is to provide the fourth six-month status report pursuant to Section IV, Condition C.2, of Reference 1. The attached report provides an update of milestone accomplishments since the last status report, including any changes to the compliance method, schedule, or need for relief and the basis, if any.

This letter contains no new regulatory commitments.

If you have any questions regarding this submittal, please contact Mr. Lee Grzeck, Manager - Regulatory Affairs, at (910) 457-2487.

I declare under penalty of perjury that the foregoing is true and correct,
executed on February 27, 2015.

Sincerely,

A handwritten signature in black ink, appearing to read 'W. R. Gideon', written in a cursive style.

William R. Gideon

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), Brunswick Steam Electric Plant (BSEP), Unit Nos. 1 and 2

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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)**

BRUNSWICK STEAM ELECTRIC PLANT (BSEP), UNIT NOS. 1 AND 2

DOCKET NOS. 50-325 AND 50-324

RENEWED LICENSE NOS. DPR-71 AND DPR-62

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

1 Introduction

Brunswick Steam Electric Plant (BSEP) developed an Overall Integrated Plan (OIP) (Reference 1 of this enclosure), documenting the diverse and flexible strategies (FLEX), in response to NRC Order EA-12-049. The OIP was submitted to the NRC on February 28, 2013. The first six-month update was submitted to the NRC on August 20, 2013 (Reference 2 of this enclosure). The second six-month update was submitted to the NRC on February 28, 2014 (Reference 3 of this enclosure). The third six-month update was submitted to the NRC on August 28, 2014 (Reference 4 of this enclosure). 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 between July 28, 2014, and January 28, 2015, hereafter referred to as the "update period."

2 Milestone Accomplishments

The following milestones were completed during the update period:

- Submit Third Six-Month Status Report
- SAT process for Training (Unit 2)
- Develop Training Plan (Unit 2)
- Perform station-specific analysis following generic BWROG FLEX implementation analysis review
- Develop Unit 2 Modification Engineering Change (EC) Packages, including Storage Facility

3 Milestone Schedule Status

The following provides an update to Attachment 2 of the OIP. It provides the activity status of each item, and whether the expected completion date has changed. The dates are planning dates and 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.

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

| Milestone | Target Completion Date | Activity Status | Revised Completion Date |
|--|-------------------------------|------------------------|--|
| Submit 60 Day Status Report | 10/29/12 | Complete | Date Not Revised |
| Submit Overall Integrated Implementation Plan | 2/28/13 | Complete | Date Not Revised |
| Submit 6 Month Status Report | 8/30/13 | Complete | Date Not Revised |
| Perform Staffing Analysis Phase 1 of NEI 12-01 | 11/29/13 | Complete | Date Not Revised |
| Submit 6 Month Status Report | 2/28/14 | Complete | Date Not Revised |
| Develop Unit 2 Modification Engineering Change (EC) Packages, including Storage Facility | 3/27/14 | *Complete | 3/30/15 Unit 2 Modifications will be completed and ready to exit RFO B222R1 |
| Perform station-specific analysis following generic BWROG FLEX implementation analysis review (Open Item 19) | 3/30/14 | *Complete | *1/31/15 |
| Develop Strategies/Contract with Regional Response Center (RRC) | 4/1/14 | Started | *Final Response Plan provided to SAFER for NSRC response and is being routed for approval. |
| Submit 6 Month Status Report | 8/29/14 | *Complete | Date Not Revised |
| SAT Process for Training (Unit 2) | 01/27/14 | *Complete | 10/31/14 |
| SAT Process for Training (Unit 1) | 1/26/15 | *Started | *Date Revised to 06/25/2015 |
| Develop Training Plan (Unit 2) | 07/27/14 | *Complete | 10/31/14 Unit 2 Training Plan continues to be revised due to large amount of Operator training in 2014. |
| Develop Training Plan (Unit 1) | 07/26/15 | Not Started | Date Not Revised |

***Indicates a change since last 6 month update.**

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

| Milestone | Target Completion Date | Activity Status | Revised Completion Date |
|--|-------------------------------|------------------------|---|
| Procure Equipment (Unit 2) | 11/27/14 | Started | 02/26/2015 Permanent Storage Building not available until Middle of January 2015 |
| Procure Equipment (Unit 1) | 11/26/15 | Started | Date Not Revised |
| Create Maintenance Procedures (Unit 2) | 01/27/15 | *Started | *03/15/2015 |
| Create Maintenance Procedures (Unit 1) | 01/26/16 | Not Started | Date Not Revised |
| Procedure Changes incorporating response strategies (Unit 2) | 01/27/15 | Started | *03/15/2015 |
| Procedure Changes incorporating response strategies (Unit 1) | 01/26/16 | Not Started | Date Not Revised |
| Implement Training (Unit 2) | 02/27/15 | Started | Date Not Revised |
| Submit 6 Month Status Report | 2/27/15 | *Started | Date Not Revised |
| Unit 2 Implementation Outage | March 2015 | Not Started | Outage Start Date moved up to February 2015 |
| Implement Modifications (Unit 2) | April 2015 | *Started | Date Not Revised |
| Submit Completion Report (Unit 2) | April 2015 | Not Started | Date Not Revised |
| Develop Unit 1 Modification EC Packages | 3/26/15 | *Started | Date Not Revised |
| Submit 6 Month Status Report | 8/31/15 | Not Started | Date Not Revised |
| Implement Training (Unit 1) | 02/26/16 | Not Started | Date Not Revised |
| Submit 6 Month Status Report | 2/29/16 | Not Started | Date Not Revised |
| Unit 1 Implementation Outage | March 2016 | Not Started | Date Not Revised |
| Implement Modifications (Unit 1) | April 2016 | Not Started | Date Not Revised |
| Submit Completion Report (Unit 1) | April 2016 | Not Started | Date Not Revised |
| Submit 6 Month Status Report | 8/31/16 | Not Started | Date Not Revised |

***Indicates a change since last 6 month update.**

4 Changes to Compliance Method

The following summarizes changes that were made during the fourth update period to the strategies as documented in the OIP (Reference 1 of this enclosure) or the changes that were provided by Reference 2, 3 & 4 of this enclosure. These changes do not impact BSEP's compliance with NEI 12-06.

- 1) Change: Brunswick Nuclear Plant (BNP) identified a change in the second 6 month update (Change # 4) where the planned utilization of the SAMA Diesel Generators was not feasible and BNP would be pre-staging the FLEX Diesel Generators (DGs) within a new FLEX Diesel Generator Building. The FLEX Diesel Generators are permanently pre-staged in a qualified structure located on top of the existing Emergency Diesel Generator 4-day tank roof and as such, are not portable. During the on-site audit, the NRC concluded that the pre-staging of the FLEX DGs is an alternative approach to NEI 12-06 which describes the use of portable equipment.

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 Permanent 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. A more detailed justification is provided in the position paper that has been provided to the staff.

Documentation: Full discussion of the FLEX Diesel Generators and the FLEX Diesel Generator Building is documented in EC's 90388, 90389 and 90390.

- 2) Change: The following clarifications are made to the Sequence of Events Timeline Constraints as documented in the OIP and six-month update reports.
 - a. Added New Action Item 3 at time 0.50 hours to Open Control Room back panel doors if Control Room ventilation is not in service.
 - b. Changed Old Action Item 3 to New Action Item 4.
 - c. Added New Action Item 5 to align Reactor Core Isolation Cooling (RCIC) suction to Torus.
 - d. Change Old Action Item 4 to New Action Item 6 for starting FLEX DG or Battery Load Shedding completed within 1 hour.
 - e. Changed Old Action Item 5 to New Action Item 7 to establish FLEX DG loaded to Div II Battery Chargers within 2 hours.
 - f. Changed Old Action Item 7 to New Action Item 8 to realign RCIC to Condensate Storage Tank (CST) and revised time line based on Modular Accident Analysis Program (MAAP) analysis.
 - g. Changed Old Action Item 6 to New Action Item 9.
 - h. Deleted Old Action Item 8, (Align SAMA diesel generator to 480 VAC to power MOV's

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- with critical load being 24/48 VDC Battery Chargers).
- i. Added New Action Item 10 to establish Battery Room Ventilation or Open Battery Room doors.
 - j. Added New Action Item 11 to refuel FLEX equipment.
 - k. Changed Old Action Item 9 to New Action Item 12 and revised time line based on MAAP analysis.
 - l. Added New Action Item 13 to establish long term Pneumatic supply for safety relief valves (SRVs) and hardened wetwell vent (HWWV).
 - m. Added New Action Item 14 to Establish makeup capability to CST's.
 - n. Changed Old Action Item 10 to New Action Item 15 and revised time line based on calculation 0FLEX-0001.
 - o. Deleted Old Action Item 11, Transition from Phase 2 to Phase 3.

Justification:

- a) This action is an existing requirement for Station Blackout Response at Brunswick.
- b) Changed order of action items to accommodate additional timed responses.
- c) RCIC normally aligned to CST by transferring to Torus while Torus temperature is below 190°F extends coping time for CST volume. (Included in MAAP analysis.)
- d) Changed from SAMA DG to FLEX DG due to problems with qualifications of SAMA equipment and connections. FLEX DG qualifications documented in EC 90388, 90389 and 90390.
- e) Changed order of action items to accommodate additional timed responses.
- f) Old action item 7 discussed changing RCIC to clean water tank but the CST has been qualified and RCIC suction will be transferred back to the CST.
- g) Changed order of action items to accommodate additional timed responses.
- h) Old Action Item 8 was developed based on NRC Order EA-12-050 which has been superseded by NRC Order EA-13-109 this action will not be required until we implement EA-13-109.
- i) Action Item added to ensure hydrogen buildup from battery charging does not reach an explosive mixture.
- j) Added new Action Item 11 since this action will be required within the first 24 hours.
- k) Changed order of action items to accommodate additional timed responses.
- l) Added as a sequence of events due to the need to setup equipment at time 20 hours. Strategy may not be required but equipment should be in the field ready to support.
- m) Makeup water to CST will be required at approximately 52 hours based on MAAP analysis of event response.
- n) Changed order of action items to accommodate additional timed responses.
- o) Deleted Old Action Item because no FLEX strategies require a transition from phase 2 to phase 3 within 72 hours.

Documentation: See Attachment 1 to this update. New Timeline will be included in Final Implementation Plan.

- 3) Change: Change table for BWR Portable Equipment phase 2.
 - a. Change electric fuel oil transfer pump to diesel driven fuel oil transfer pump
 - b. Change Radiation Protection Equipment to not required.

Justification:

- a) Diesel-driven fuel oil transfer pump same as phase 3 equipment obtained to keep response for phase 2 and phase 3 consistent.
- b) Evaluation completed with site radiation protection (RP) organization and no additional

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RP equipment identified as being required.

Documentation: Final table will be included in the Final Integrated Plan.

- 4) Change: Change table for BWR Portable Equipment Phase 3.
- a. Change 3 to 4 MWe 4160 VAC generator to 500 KWe 480 VAC generator
 - b. Delete diesel fuel required
 - c. Delete 4160 VAC transformers
 - d. Delete 480 VAC transformers
 - e. Delete water purification skid
 - f. Delete large heat exchangers
 - g. Delete fresh water tankers
 - h. Delete battery chargers for 125 V DC
 - i. Delete water removal and storage
 - j. Delete temporary housing
 - k. Delete portable ventilation fans

Justification:

- a) Determined need for FLEX strategy was a 480 VAC generator and not a 4160 VAC generator.
- b) Development of SAFER response determined fuel oil would not be delivered.
- c) No 4160 VAC transformers require use of 480 VAC generator.
- d) No 480 VAC transformers required as connections for phase 3 generator are built into the FLEX distribution system.
- e) Determined purification skid not feasible, makeup to CST established through a tiered approach with Demineralized Water Tank, Fire Protection Tank, Offsite Capability (i.e., water trucks) and Discharge Canal.
- f) Heat exchangers determined to be a recovery action and not a coping action.
- g) Fresh water tankers not available from SAFER.
- h) Alternate battery chargers not required to support flex strategy response.
- i) No identified need for water removal and storage associated with flex strategies.
- j) No housing needs identified for coping strategies.
- k) No ventilation fans identified for phase 3 response.

Documentation: Final table will be included in the Final Integrated Plan. For change item 4.e, see Change to Compliance Method change item 5.

- 5) Change: Guidance has been developed for a long-term makeup water strategy using a tiered approach.

Justification:

The strategy for water supply to the reactor and the spent fuel pool uses a tiered approach to supply water in order of preference based on its purity, temperature, and supply volume. The initial makeup to the RPV is from the CST until the early transfer to the suppression pool (SP). Since decay heat removal during an extended loss of AC power (ELAP) is via safety-relief valve (SRV) discharge to the SP, this strategy maximizes the time during which no outside makeup source of water is required. The limiting factor in this configuration is the required net positive suction head (NPSH) for the RCIC pump as well as the potential for RCIC pump seal

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leakage. BNP RCIC analysis indicated that there is no concern for NPSH with SP temperature less than 193°F (Reference 1, Page 9). BWROG documents indicate that no RCIC seal leakage is expected for suction temperatures less than 190°F (Reference 2, Page 9). The Modular Accident Analysis Program (MAAP) analysis of BNP-MECH-002 (Reference 3, Page 9) indicates that the SP heats up to 190°F in about 2 hours. Once the SP temperature reaches 190°F, RCIC suction is realigned to the CST. The MAAP analysis further calculates that RCIC uses 375,000 gallons, likely making the CST empty or nearly so, in about 52 hours after event initiation. This gives adequate time to establish CST makeup.

If an ELAP occurs, part of the response in the first few hours will be to call for outside CST makeup in order to ensure this water arrives before the CST is depleted. Initially however, installed station tanks that have survived the initiating event will be used. Long term outside makeup is via clean water trucks as a preferred source and from the discharge canal if water trucks are not available in time. The Emergency Response Organization will determine what water is available and will take steps to put the various sources in service in the following order of preference:

1. Suppression Pool with temperature below 190°F.
2. Condensate Storage Tanks (Unit 1 and Unit 2 CSTs can be cross-tied)
3. Demineralized Water Tank (MUD)
4. Fire Protection Tank
5. Water trucks
6. Discharge Canal

For the water truck strategy, portable tanks will be set up in the parking lot east of the TAC building. Hoses, fittings, and pumps will be available from the NSRC or, if available, in the FLEX building, to pump this water from the portable tanks to the CSTs. The water trucks will be routed through the parking lot to empty their water into these portable tanks as needed.

For the discharge canal strategy, the NSRC pumps, strainer, hoses and fittings will be available to pump water from the canal to the CSTs of both units.

As part of the makeup water strategy, consideration was given for the implications of injecting raw water into the reactor pressure vessel, which occurs if either the truck method or discharge canal is used. BWROG documents (Reference 4, Page 9) and the EPRI Technical Basis document (Reference 5, Page 9) provide the basis for the expectation that raw water will adequately cool the core. However, in accordance with the BWROG document, steps in the EOPs or SAGs that direct injection of raw water also provide guidance that the water level in the RPV should be maintained at the level of the moisture separator drains. This will ensure core cooling in the case that the flow orifices and debris filters at the bottom of the core become clogged (Reference 6, Page 9).

In order to ensure that the NSRC pumps are able to supply water from the discharge canal to the CSTs, the capacity of the NSRC pumps was compared to the existing calculation verifying that the station's EDMG pump can supply water from the discharge canal to the CST. Calculation BNP-MECH-B5B (Reference 7, below) analyzed the station's B.5.b pump capacity. In this calculation, the pump is assumed to have a capacity of 500 gpm at 250 psig with a suction lift of 21 feet. This capacity was used in the flow model that analyzed the head

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loss in the hoses, fittings and connections for various modes of operation and demonstrated sufficient capacity of the B.5.b pump.

Reference 8 below states that the Low Pressure / Medium Flow portable pump supplied by the NSRC is rated for 300 psi at 2500 gpm and that the suction lift pump will be capable of supplying 5000 gpm with 26 feet of lift to the Low Pressure / Medium flow pump. Reference 7 (below) shows that only 21 feet of lift is required to pump from the discharge canal. Since the NSRC pumps are rated for higher pressure, flow and suction lift than the EDMG pump, it is assured that they will be capable of providing more flow to the CST and SFP than the B.5.B pump and no further analysis is required.

References:

1. Calculation 9527-8-E41-06F, Revision 1, NPSH Requirements – RCIC and HPCI.
2. Beyond Design Basis RCIC Elevated Temperature Functionality Assessment, BWROG-TP-14-018, December 2014 (proprietary).
3. Calculation BNP-MECH-FLEX-0002, Brunswick Nuclear Plant Containment analysis of FLEX Strategies, Revision 0, December 2014.
4. Raw Water Issue: Fuel Inlet Blockage from Debris, BWROG-TP-14-006, Revision 0, March 2014 (proprietary).
5. Severe Accident Management Guidance Technical Basis Report, EPRI 1025295, 2012 (proprietary).
6. BWROG Emergency Procedures Committee EPG/SAG issue 1216, approved September 2014.
7. Calculation BNP-MECH-B5B, Extreme Damage Mitigation Guidelines: Engineering Hydraulic Basis, Revision 1, June 2009.
8. AREVA, Inc., Engineering Information Record 51-9199717-012, National SAFER Response Center Equipment Technical Requirements, January 2014.

Documentation:

- 1) Reactor Vessel Control flow chart (2EOP-01-RVCP) Override in step RC/L-3 provides guidance that if injecting salt water OR off-site water to Restore and Maintain level between +192 inches and +225 inches per EPG approved Issue Item 1216.
- 2) Guidance will be provided to the Emergency Response Organization for utilizing the discharge canal to refill the CST.
- 3) Reference 4 which was provided to the NRC discusses the basis to utilize salt water.

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

BSEP expects to comply with the order implementation but has selected an alternate approach to NEI 12-06 associated with FLEX response to energize the Division II Battery Chargers. See Change to Compliance Method change item 1.

6 Open Items

Generic Concerns

None

Plan Open Items

Tables 6A and 6B provide a summary status of the Open Items. Table 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 report submitted in Reference 2, 3 and 4 of this enclosure. Table 6.b. provides a list of open items that were added after July 28, 2014.

Table 6a. Open Items Documented in the Overall Integrated Plan

| Overall Integrated Plan Open Item | Status |
|--|--|
| 1. Perform a formal validation of FLEX deployment, connection, and action timelines after the procedural guidance is developed and related staffing study is completed. | Started |
| 2. Implement programmatic controls. | Started Programmatic Controls (Also 04, 06, 09 & 12) |
| 3. Develop plant equipment control guidelines, in accordance with NEI 12-06 Section 11.5, to manage the unavailability of equipment and applicable connections that directly perform a FLEX mitigation strategy. | Started NRC Audit closed to tracking document |
| 4. Establish programs and process to assure personnel proficiency in the mitigation of beyond- design-basis events is developed and maintained in accordance with NEI 12-06 Section 11.6. | Started |
| 5. Maintain FLEX strategies in overall FLEX basis documents. | Started |
| 6. Modify existing plant configuration control procedures to ensure that changes to the plant design, physical plant layouts, roads, buildings, and miscellaneous structures will not adversely impact the approved FLEX strategies in accordance with NEI 12-06 Section 11.8. | Started |
| 7. Complete applicable training prior to the implementation of FLEX. | Started |
| 8. Complete construction of FLEX Equipment Storage Building prior to the implementation of FLEX. | Started |
| 9. Develop BSEP procedures and programs to address storage structure requirements, deployment path requirements, and FLEX equipment requirements relative to the hazards applicable to BSEP. | Started |

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| Overall Integrated Plan Open Item | Status |
|--|---|
| 10. Design FLEX equipment connection points (e.g. mechanical, pneumatic, and electrical) to withstand the applicable external hazards. | Complete |
| 11. Perform study to validate Suppression Pool temperatures exceeding 220°F. | Complete |
| 12. Develop site specific procedures or guidelines, utilizing the industry developed guidance from the Owners' Groups, EPRI, and NEI Task team, to address the criteria in NEI 12-06. | Started |
| 13. Deleted | Deleted |
| 14. Complete SFP level instrumentation modifications per NRC Order EA 12-051, Issuance of Order to Modify Licenses With Regard to Reliable Spent Fuel Pool Instrumentation. | Started EC 89577 (U1) EC 89578 (U2) |
| 15. Develop deep load-shedding procedures to extend coping time for station batteries. | Delete 2nd 6-month update change #7. Deep load shedding procedures are not required. Load shedding activities are contained in SBO-10. |
| 16. Modify procedures such that operator manual actions, in areas where habitability is a concern, occur early in the FLEX timeline, to the extent practical. | Started AR 593834-16 Incorporate early timeline for manual operator actions. |
| 17. Revise procedures to open Reactor Building doors to provide a natural air circulation path. | Started 0EOP-01-SBO-04 |
| 18. Provide transportation equipment to move large skids/trailer-mounted equipment provided from off-site. | Started |
| 19. Review generic BWROG analysis of FLEX implementation and perform station-specific analysis (NEDC 33771P, Revision 1). | Completed |
| 20. Develop a process/methodology to rupture the Wetwell Vent Disc with Containment pressure below 55 psi. | Started 0EOP-01-SEP-01 rev. 25 Attachment 1 |
| 21. Develop a process/methodology to provide Clean Water Makeup to the CST during Phase 3 response. | Started |
| 22. Develop guidance for obtaining local vital indications during a loss of DC in conjunction with an ELAP. This strategy will be available for appropriate plant personnel use in response to these failures. | Started 0EOP-01-FSG-08 NRC Audit tracking |
| 23. Provide justification showing the Unit 1 CST & Unit 2 CST are robust from applicable external hazards. | Started EC 95856 EC 95811 |
| 24. Develop a DC power coping analysis IAW IEEE- 485 and establish an appropriate coping time for FLEX response. | Started Nexus Report No.: 13-4085.001 |

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Table 6b. Open Items added after July 28, 2014

| Overall Integrated Plan Open Item | Status |
|--|--|
| 25. NRC Audit SE.8 Verify SFP crane bridge does not impede SFP strategy. | Started. |
| 26. NRC Audit SE.9 Verify plant stack vulnerability to seismic, tornado, and wind-driven missile hazards. | Completed stack tornado missile analysis. Started update to 2MSS-0011, Evaluation of the Plant Stack for Tornado Wind Forces and 2 x SSE Earthquake. |
| 27. NRC Audit SE.10 Verify robustness of RWCU piping credited in FLEX strategies. | Started. |

7 References

The following references support updates to the Overall Integrated Plan as 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, Agencywide Documents Access and Management System (ADAMS) Accession Number ML13071A559
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 20, 2013, ADAMS Accession Number ML13248A447
3. 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 28, 2014, ADAMS Accession Number ML14073A451
4. 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 28, 2014, ADAMS Accession Number ML14254A176
5. Nuclear Regulatory Commission (NRC) Order Number EA-12-049, *Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events*, dated March 12, 2012, ADAMS accession Number ML12054A735
6. NRC Interim Staff Guidance JLD-ISG-2012-01, *Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events*, Revision 0, dated August 29, 2012, ADAMS Accession Number ML12229A174
7. NEI 12-06, *Diverse and Flexible Coping Strategies (FLEX) Implementation Guide*, Revision 0, dated August 2012, ADAMS Accession Number ML12242A378
8. CP&L and FPC to NRC, *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 Number ML12307A021
9. NRC letter from Jack R. Davis, Director Mitigating Strategies Directorate Office of Nuclear Reactor Regulation, to Nuclear Energy Institute, Mr. Joseph E. Pollock, Vice President Nuclear Operations, dated September 16, 2013, (ADAMS Accession Number ML13241A188)
10. NRC Order Number EA-12-050, *Issuance of Order to Modify Licenses with Regard to Reliable Hardened Containment Vents*, dated March 12, 2012, ADAMS Accession Number ML12054A694

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11. NRC Order Number EA-13-109, *Issuance of Order to Modify Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions*, dated June 6, 2013, ADAMS Accession Number ML13143A321

Attachment 1

Updated Attachment 1A from OIP

Sequence of Events Timeline

| Action Item | Elapsed Time (hours) | Action | Time constraint Y/N Level of Validation | Remarks/Applicability |
|-------------|----------------------|---|--|--|
| 1 | 0 | Event Starts | NA | Plant @ 100% power |
| 2 | 0.25 | SBO is declared | N | Emergency DC oil pumps will be cycled off as turbines coast down and H2 vented. |
| 3 | 0.50 | Open Control Room back panel doors if CR ventilation not in service | Y Level A | SBO-02 |
| 4 | 1.0 | Begin to depressurize RPV to 150 - 300 psig | Y Level A | >100°F/hr |
| 5 | <1.0 | Align RCIC suction to Torus | Y Level A | Input to MAAP analysis for coping time of CST |
| 6 | 1.0 | FLEX DG started and loaded or Battery Load Shedding completed | Y Level A | Both do not have to be completed, if FLEX DG not in service load shed extends coping time for Div II batteries to 2 hours. |
| 7 | 2 | FLEX DG loaded to Div II Battery Chargers | Y Level A | Div. II Batteries required for Key Electrical Components |

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| Action Item | Elapsed Time (hours) | Action | Time constraint Y/N Level of Validation | Remarks/Applicability |
|-------------|----------------------|---|--|--|
| 8 | ~2.9 | RCIC aligned to CST | N | Transfer to CST is based on Torus Temperature of 190°F This is not a time constraint for FLEX response. Time estimate from MAAP analysis. |
| 9 | 6 | Perform and complete manual actions on 117' Reactor Building for SFP spray and Reactor Building Natural Circulation | Y Level B | These actions are for habitability concerns and the time line is based on temperatures at the 117' elevation roof. This is a time constraint for Reactor Building habitability analysis. |
| 10 | 8.4 | Establish Battery Room ventilation OR Open Battery Room Doors | Y Level B | Ventilation to prevent H2 explosive concentration in Battery Rooms |
| 11 | 12 | Refuel FLEX equipment | Y Level B | Use normal means if available or OEOP-01-FSG-06 if required. |
| 12 | ~17.7 | Vent containment via HCVS | N | Takes place prior to exceeding PCPL-A (70 psia). This is not a time constraint for FLEX response. Time estimate from MAAP analysis. |
| 13 | 20 | Establish long term Pneumatic Supply for SRV's and HWWV | Y Level C | 20 hours is minimum time limit, actual time expected >20 hours based on Backup Nitrogen Bank pressure. |
| 14 | ~52 | Establish makeup water to CST's | Y Level C | Time estimate from MAAP. |

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| Action Item | Elapsed Time (hours) | Action | Time constraint Y/N Level of Validation | Remarks/Applicability |
|--------------------|-----------------------------|---|--|---|
| 15 | 72 | Establish FLEX pump connection to SFP makeup. | Y Level C | Time evaluation contained in calculation 0FLEX-0001 and determines makeup is not required to SFP prior to 72 hours. |