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Serial: BSEP 16-0006

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  
Sixth 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
9. Duke Energy Letter, *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)*, dated February 27, 2015, ADAMS Accession Number ML15084A156
10. Duke Energy Letter, *Fifth 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, 2015, ADAMS Accession Number ML15246A034
11. Duke Energy Letter, *Notification of Full Compliance with Order EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond Design Basis External Events" and Order EA-12-051, "Order to Modify Licenses With Regard To Reliable Spent Fuel Pool Instrumentation" for BSEP, Unit 2*, dated June 3, 2015, ADAMS Accession Number ML15173A013

Ladies and Gentlemen:

On March 12, 2012, the Nuclear Regulatory Commission (NRC) issued Order EA-12-049 (i.e., Reference 1) to Duke Energy Progress, Inc. (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, 8, 9, and 10 provided the first, second, third, fourth, and fifth six-month status reports, respectively, for BSEP. Reference 11 provided notification of full compliance with Order EA-12-049 for BSEP, Unit 2.

The purpose of this letter is to provide the sixth 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 24, 2016.

Sincerely,

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

William R. Gideon

Enclosure: Sixth 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

cc (with enclosure):

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ENCLOSURE

SIXTH 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

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

### **1 Introduction**

Note: References are provided in Section 7 of this enclosure.

Brunswick Steam Electric Plant (BSEP) developed an Overall Integrated Plan (OIP) (Reference 1) 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). The second six-month update was submitted to the NRC on February 28, 2014 (Reference 3). The third six-month update was submitted to the NRC on August 28, 2014 (Reference 4). The fourth six-month update was submitted to the NRC on February 27, 2015 (Reference 5). The fifth six-month update was submitted to the NRC on August 26, 2015 (Reference 6). 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, 2015, and January 28, 2016, hereafter referred to as the update period. Reference 7 provided notification of full compliance with Order EA-12-049 for BSEP, Unit 2.

### **2 Milestone Accomplishments**

The following milestones were completed during the update period:

- Procure Equipment (Unit 1)
- Develop Unit 1 Modification EC Packages
- Submit Fifth Six-Month Status Report

### **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.

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Milestone	Target Completion Date	Activity Status	Revised Completion Date
<b>*Indicates a change since last 6 month update.</b>			
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)	February 2015	Complete	Date Revised
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	Complete	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	Complete	Date Not Revised
Procure Equipment (Unit 2)	11/27/14	Complete	02/26/2015 Permanent Storage Building not available until Middle of January 2015
Procure Equipment (Unit 1)	11/26/15	<b>*Complete</b>	Date Not Revised
Create Maintenance Procedures (Unit 2)	01/27/15	Complete	03/15/2015

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Milestone	Target Completion Date	Activity Status	Revised Completion Date
<b>*Indicates a change since last 6 month update.</b>			
Create Maintenance Procedures (Unit 1)	<b>*03/25/16</b>	Started	<b>*Date Revised from 01/26/16 to 03/25/16. Procedure changes implemented during Spring 2016 Outage.</b>
Procedure Changes incorporating response strategies (Unit 2)	01/27/15	Complete	03/15/2015
Procedure Changes incorporating response strategies (Unit 1)	<b>*03/25/16</b>	Started	<b>*Date Revised from 01/26/16 to 03/25/16. Procedure changes implemented during Spring 2016 Outage.</b>
Implement Training (Unit 2)	02/27/15	Complete	Date Not Revised
Submit 6 Month Status Report	2/27/15	Complete	Date Not Revised
Unit 2 Implementation Outage	March 2015	Complete	Outage Start Date moved up to February 2015
Implement Modifications (Unit 2)	April 2015	Complete	Date Not Revised
Submit Completion Report (Unit 2)	April 2015	Complete	Date Not Revised
Develop Unit 1 Modification EC Packages	11/26/15	<b>*Complete</b>	Date Revised
Submit 6 Month Status Report	8/31/15	<b>*Complete</b>	Date Not Revised
Implement Training (Unit 1)	02/26/16	Started	Date Not Revised
Submit 6 Month Status Report	2/29/16	<b>*Started</b>	Date Not Revised
Unit 1 Implementation Outage	February 2016	Not Started	Outage Start Date moved up to February 2016
Implement Modifications (Unit 1)	April 2016	<b>*Started</b>	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



#### **4 Changes to Compliance Method**

The following summarizes changes that were made during the sixth update period to the strategies as documented in the OIP (Reference 1 of this enclosure) or to the changes that were provided by References 2, 3, 4, 5, and 6 of this enclosure. These changes do not impact BSEP's compliance with NEI 12-06.

- 1) Change: One of two raw water supply methods for Condensate Storage Tank (CST) refill (i.e., water trucks and portable tanks) is removed from the CST fill strategy. The discharge canal water supply is maintained as the raw water supply for the water makeup strategy. Reference 5 provided the initial long term makeup water strategy.

Justification:

CST refill uses on-site clean water sources that survive the Beyond Design Basis External Event (BDBEE) before using raw water. During development of the CST refill strategy, the site established the "discharge canal" and "water trucks and portable tanks" as raw water sources. The "water trucks and portable tanks" water source, which relies upon a private off-site company to truck water to the site, may not be a reliable source following a BDBEE. BSEP has the resources (i.e., personnel, equipment, and procedures) to supply water to the CSTs from the plant discharge canal (i.e., an indefinite supply of water) following a BDBEE. BSEP has implemented the BWROG-TP-14-006 guidance for use of raw water into the Reactor Vessel Control Procedure Emergency Operating Procedure. Compliance with NEI 12-06 is not impacted.

Documentation:

1. 0EOP-01-FSG-15, Unit 2 FLEX Condensate Storage Tank Fill
2. 1/2EOP-01-RVCP, Reactor Vessel Control
3. BWROG-TP-14-006, Raw Water Issue: Fuel Inlet Blockage from Debris, Revision 0, March 2014 (proprietary)

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

There are no changes to the need for relief/relaxation during this sixth update period.

#### **6 Open Items**

Generic Concerns

None

Plan Open Items

Tables 6a and 6b provide a summary status of the Open Items. Table 6a provides the open items that were previously identified in the original OIP submitted on February 28, 2013, and in the first, second, third, fourth, and fifth six-month status report submitted in Reference 2, 3, 4, 5, and 6 of this enclosure. Table 6b provides a list of open items that were added after July 28, 2015.

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

Overall Integrated Plan Open Item	Status
<b>*Indicates a change since last 6 month update.</b>	
1. Perform a formal validation of FLEX deployment, connection, and action timelines after the procedural guidance is developed and related staffing study is completed.	Complete
2. Implement programmatic controls.	Complete
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.	Complete
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.	Complete
5. Maintain FLEX strategies in overall FLEX basis documents.	Complete
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.	Complete
7. Complete applicable training prior to the implementation of FLEX.	Complete (Unit 2) Started (Unit 1)
8. Complete construction of FLEX Equipment Storage Building prior to the implementation of FLEX.	Complete
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.	Complete
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.	Complete (Unit 2) Started (Unit 1)
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.	Complete (Unit 2) Started (Unit 1)

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Overall Integrated Plan Open Item	Status
<b>*Indicates a change since last 6 month update.</b>	
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.	Complete (Unit 2) Started (Unit 1)
17. Revise procedures to open Reactor Building doors to provide a natural air circulation path.	Complete (Unit 2) <b>*Complete</b> (Unit 1)
18. Provide transportation equipment to move large skids/trailer-mounted equipment provided from off-site.	Complete
19. Review generic BWROG analysis of FLEX implementation and perform station-specific analysis (NEDC 33771P, Revision 1).	Complete
20. Develop a process/methodology to rupture the Wetwell Vent Disc with Containment pressure below 55 psi.	Complete (Unit 2) <b>*Complete</b> (Unit 1)
21. Develop a process/methodology to provide Clean Water Makeup to the CST during Phase 3 response.	Complete (Unit 2) Started (Unit 1)
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.	Complete (Unit 2) Started (Unit 1)
23. Provide justification showing the Unit 1 CST and Unit 2 CST are robust from applicable external hazards.	Complete
24. Develop a DC power coping analysis IAW IEEE-485 and establish an appropriate coping time for FLEX response.	Complete

**Table 6b. Open Items added after July 28, 2015**

Overall Integrated Plan Open Item	Status
No new open items during this sixth update period.	

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

### 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. Duke Energy Letter, *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)*, dated February 27, 2015, ADAMS Accession Number ML15084A156
6. Duke Energy Letter, *Fifth 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, 2015, ADAMS Accession Number ML15246A034
7. Duke Energy Letter, *Notification of Full Compliance with Order EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond Design Basis External Events" and Order EA-12-051, "Order to Modify Licenses With Regard To Reliable Spent Fuel Pool Instrumentation" for BSEP, Unit 2*, dated June 3, 2015, ADAMS Accession Number ML15173A013
8. 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
9. 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
10. NEI 12-06, *Diverse and Flexible Coping Strategies (FLEX) Implementation Guide*, Revision 0, dated August 2012, ADAMS Accession Number ML12242A378
11. 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*

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

*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