



**William R. Gideon**  
Vice President  
Brunswick Nuclear Plant  
P.O. Box 10429  
Southport, NC 28461

o: 910.457.3698

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

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  
Response to Request for Additional Information, License Amendment Request  
for Adoption of Technical Specifications Task Force (TSTF) Traveler TSTF-423,  
Revision 1, "Technical Specifications End States, NEDC-32988-A"

References:

1. Letter from William R. Gideon (Duke Energy) to U.S. Nuclear Regulatory Commission, *License Amendment Request for Adoption of Technical Specifications Task Force (TSTF) Traveler TSTF-423, Revision 1, "Technical Specifications End States, NEDC-32988-A"*, dated September 28, 2016, ADAMS Accession Number ML16287A415
2. U.S. Nuclear Regulatory Commission E-mail Capture, *Brunswick Unit 1 and Unit 2 Request for Additional Information Related to LAR to Modify the TS Requirements for End States Associated with the Implementation of the Approved TSTF Traveler TSTF-423-A (CAC NOS. MF8466 and MF8467)*, dated February 3, 2017, ADAMS Accession Number ML17037A002

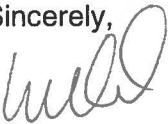
Ladies and Gentlemen:

By letter dated September 28, 2016 (i.e., Reference 1), Duke Energy Progress, LLC, (Duke Energy) submitted a license amendment request (LAR) for the Brunswick Steam Electric Plant (BSEP), Unit Nos. 1 and 2. The proposed amendment would modify the Technical Specifications to risk-inform requirements regarding selected Required Action end states by incorporating the Boiling Water Reactor (BWR) Owners' Group (BWROG) approved Topical Report NEDC-32988-A, Revision 2, "Technical Justification to Support Risk-Informed Modification to Selected Required Action End States for BWR Plants." Additionally, the proposed amendment would modify the TS Required Actions with a Note prohibiting the use of limiting condition for operation (LCO) 3.0.4.a when entering the preferred end state (i.e., Mode 3) on reactor startup. On February 3, 2017, by electronic mail (i.e., Reference 2), the NRC provided a request for additional information (RAI) regarding the LAR. Duke Energy's response to the RAI is provided in Enclosure 1.

Revised regulatory commitments are contained in Enclosure 2 of this letter.

Please refer any questions regarding this submittal to 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 March 25, 2017.

Sincerely,  


William R. Gideon

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Enclosures:

1. Response to Request for Additional Information
2. Regulatory Commitments

cc (with Enclosures):

U. S. Nuclear Regulatory Commission, Region II  
ATTN: Ms. Catherine Haney, Regional Administrator  
245 Peachtree Center Ave, NE, Suite 1200  
Atlanta, GA 30303-1257

U.S. Nuclear Regulatory Commission  
ATTN: Mr. Andrew Hon (Mail Stop OWFN 8G9A) **(Electronic Copy Only)**  
11555 Rockville Pike  
Rockville, MD 20852-2738  
Andrew.Hon@nrc.gov

U.S. Nuclear Regulatory Commission  
ATTN: Ms. Michelle P. Catts, NRC Senior Resident Inspector  
8470 River Road  
Southport, NC 28461-8869

Chair - North Carolina Utilities Commission **(Electronic Copy Only)**  
4325 Mail Service Center  
Raleigh, NC 27699-4300  
swatson@ncuc.net

Mr. W. Lee Cox, III, Section Chief **(Electronic Copy Only)**  
Radiation Protection Section  
North Carolina Department of Health and Human Services  
1645 Mail Service Center  
Raleigh, NC 27699-1645  
lee.cox@dhhs.nc.gov

## Response to Request for Additional Information

By letter dated September 28, 2016, Duke Energy Progress, LLC, (Duke Energy) submitted a license amendment request (LAR) for the Brunswick Steam Electric Plant (BSEP), Unit Nos. 1 and 2. The proposed amendment would modify the Technical Specifications (TSs) to risk-inform requirements regarding selected Required Action end states by incorporating the Boiling Water Reactor (BWR) Owners' Group (BWROG) approved Topical Report NEDC-32988-A, Revision 2, "Technical Justification to Support Risk-Informed Modification to Selected Required Action End States for BWR Plants." Additionally, the proposed amendment would modify the TS Required Actions with a Note prohibiting the use of limiting condition for operation (LCO) 3.0.4.a when entering the preferred end state (i.e., Mode 3) on reactor startup. On February 3, 2017, by electronic mail, the NRC provided a request for additional information (RAI) regarding the LAR. Duke Energy's response to the RAI is provided below.

### NRC RAI 1

#### *Background*

While working on similar applications, the NRC staff had earlier noticed that a regulatory guidance document used in the staff's regulatory assessments for the end-states related TSTFs and referenced in the staff's model SEs for such TSTFs, had been superseded and therefore, is not valid guidance for the adoption of the staff's approved TSTFs. The issue concerns the reference to Regulatory Guide (RG) 1.182, "Assessing and Managing Risk Before Maintenance Activities at Nuclear Power Plants," (ADAMS Accession No. ML003699426) in TSTF-423, Revision 1 (ADAMS Accession No. ML093570241) as well as model safety evaluation (ADAMS Accession No. ML120200384) for the TSTF, which states,

RG 1.182, "Assessing and Managing Risk before Maintenance Activities at Nuclear Power Plants" (Reference 6), provides guidance on implementing the provisions of 10 CFR 50.65(a)(4) by endorsing a revised Section 11 to NUMARC 93-01, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants" (Reference 7).

On November 27, 2012, via Federal Register Notice 78 FR 70846, the NRC staff informed the industry that RG 1.182 had been withdrawn by the staff since it was determined that the document (RG 1.182) was redundant due to the inclusion of its subject matter in Revision 3 of RG 1.160, "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants." The Notice also stated that withdrawal of RG 1.182 neither altered any prior or existing licensing commitments based on its use, nor constituted backfitting as defined in Title 10 of the Code of Federal Regulations (10 CFR) 50.109 (the Backfit Rule) and was not otherwise inconsistent with the issue finality provisions in 10 CFR, Part 52. In addition, the NRC staff observed that RG 1.160 endorsed Revision 4A of the Nuclear Management and Resources Council (NUMARC) 93-01, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants." NUMARC 93-01 provides methods that are acceptable to the NRC staff for complying with the provisions of Section 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," of Title 10, of the Code of Federal Regulations, Part 50, "Domestic Licensing of Production and Utilization Facilities" (10 CFR Part 50) (Ref. 2). The model SE for the TSTF refers to the guidance in NUMARC 93-01,

Section 11, "Assessment of Risk Resulting from Performance of Maintenance Activities," dated February 22, 2000 (ADAMS Accession No. ML003704489).

*RAI*

In order to justify adoption of the approved TSTF changes, please confirm that Brunswick's current licensing basis adheres to the RG 1.160 guidance and contains a commitment to the updated version of NUMARC 93-01. (For details, you may also refer to the NRC staff's letter dated, February 26, 2015 (ADAMS Accession No. ML15033A152), in response to the TSTF Group's letter, dated, September 16, 2014 (ADAMS Accession No. ML14259A575), on the subject matter.)

BSEP Response

Duke Energy confirms that BSEP's current licensing basis adheres to Regulatory Guide 1.160 and commits to follow the guidance in Section 11 of NUMARC 93-01, "Industry Guidance for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," Nuclear Management and Resource Council, Revision 4A, April 2011. Enclosure 2 contains revised commitments reflecting the BSEP current licensing basis.

NRC RAI 2

*Background*

Regarding the licensee's proposed change to LCO 3.5.1, "ECCS – Operating," the licensee's variation/deviation #3 in its application, states:

Condition C of BSEP TS 3.5.1 is proposed to be revised per TSTF-423; however, it applies when Conditions A or B are not met. Conditions in BSEP TS 3.5.1 are numbered differently from the Standard TS Conditions.

It further states:

Condition A of the Standard TS and Condition A of the BSEP TS 3.5.1 are equivalent. BSEP TS 3.5.1 includes Condition B for one Low Pressure Coolant Injection (LPCI) pump and one Core Spray (CS) subsystem inoperable concurrently. The justification provided in the topical report and model Safety Evaluation for this change is also applicable to Condition B of the BSEP TS 3.5.1.

The proposed change to Condition A of BSEP TS 3.5.1 appeared to be equivalent to that of end state change specified for Condition A of the Standard TS 3.5.1. However, for Condition B regarding inoperability of one Low Pressure Coolant Injection (LPCI) pump and one Core Spray (CS) subsystem, the proposed change does not appear to be in accordance with the approved Technical Specifications Task Force (TSTF) Traveler TSTF-423, Revision 1, i.e. the justification provided in the topical report and model Safety Evaluation for this change does not appear to be applicable to Condition B of the BSEP TS 3.5.1. Thus, the NRC staff considers the proposed change beyond the scope of the approved TSTF.

*RAI*

Please provide Emergency Core Cooling Systems (ECCS) analysis and containment analysis and results to verify acceptable ECCS performance, containment integrity, Environmental Equipment Qualification (EEQ), and containment heat removal for a design basis Loss of Coolant Accident (LOCA) in Mode 3 when one LPCI pump and one CS pump are concurrently inoperable in this mode.

BSEP Response

The BSEP ECCS is designed, in conjunction with the primary and secondary containment, to limit the release of radioactive materials to the environment following a loss of coolant accident (LOCA). The ECCS uses two diverse methods (i.e., flooding and spraying) to cool the core during a LOCA. The ECCS consist of the High Pressure Coolant Injection (HPCI) System, the Core Spray (CS) System, the low pressure coolant injection (LPCI) mode of the Residual Heat Removal (RHR) System, and the Automatic Depressurization System (ADS). The suppression pool provides the required source of water for the ECCS.

In order to determine the acceptability of the BSEP response to a LOCA, the most limiting combination of break size, location, and single failure was determined. The potential single failures considered in the ECCS LOCA analysis are summarized in Updated Final Safety Analysis Report (UFSAR) Table 6-15, "Single Failures and Available Systems Considered for ECCS LOCA Analysis." All potential single failures are no more severe than one of the single failures identified in UFSAR Table 6-15.

<b>Single Failures and Available Systems Considered for ECCS LOCA Analysis</b>		
<b>Break Location</b>	<b>Single Failure</b>	<b>Systems Available</b>
Suction	None	2LPCS+4LPI2+HPCI+ADS
Suction	DC Power (i)	1LPCS+3LPI2+ADS
Suction	DC Power (j)	2LPCS+2LPCI+HPCI+ADS
Suction	Diesel Generator (i)	1LPCS+3LPI2+HPCI+ADS
Suction	Diesel Generator (j)	2LPCS+2LPCI+HPCI+ADS
Suction	LPCI Injection Valve	2LPCS+2LPCI+HPCI+ADS
Suction	HPCI System	2LPCS+4LPI2+ADS
Discharge	None	2LPCS+2LPCI+HPCI+ADS
Discharge	DC Power (i)	1LPCS+1LPCI+ADS
Discharge	DC Power (j)	2LPCS+HPCI+ADS
Discharge	Diesel Generator (i)	1LPCS+1LPCI+HPCI+ADS
Discharge	Diesel Generator (j)	2LPCS+HPCI+ADS

<b>Single Failures and Available Systems Considered for ECCS LOCA Analysis</b>		
<b>Break Location</b>	<b>Single Failure</b>	<b>Systems Available</b>
Discharge	LPCI Injection Valve	2LPCS+HPCI+ADS
Discharge	HPCI System	2LPCS+2LPCI+ADS
Core Spray Line	DC Power (i)	3LP12+ADS
Feed Water Line	DC Power (i)	1LPCS+3LPI2+ADS
Steam Line	DC Power (i)	1LPCS+3LPI2+ADS
<b>NOTES</b>		
1LPCI - One LPCI pump into one loop 2LPCI - Two LPCI pumps into one loop 2LPI2 - Two LPCI pumps into two loops 3LPI2 - Three LPCI pumps into two loops 4LPI2 - Four LPCI pumps into two loops (i) These failures assume the failure of either a battery or diesel generator associated with the unit experiencing the LOCA. (j) These failures assume the failure of either a battery or diesel generator associated with the unit not experiencing a LOCA.		

In the above table, one LPCI pump and one CS pump concurrently inoperable corresponds to the highlighted 1LPCS+3LP12 System Available cases.

For each of the above cases, the BSEP LOCA Analysis demonstrates that their consequences are mitigated to within acceptable regulatory limits. The BSEP LOCA Analysis is performed at 102 percent of Rated Thermal Power (RTP) and fully bounds a hypothetical Mode 3 LOCA. Therefore, containment integrity, EEQ, and containment heat removal for a Mode 3 LOCA when one LPCI pump and one CS pump are concurrently inoperable remain acceptable.

The above discussion demonstrates that one LPCI pump and one CS pump concurrent inoperability (i.e., BSEP TS 3.5.1, Condition B) is equivalent to having one LPCI pump inoperable in both LPCI subsystems (i.e., Standard TS 3.5.1, Condition A) with respect to the ability to deal with a hypothetical Mode 3 LOCA. Therefore, the comparative Probabilistic Safety Analysis evaluation (i.e., discussed in Section 4.5.2.3, "LCO 3.5.1 - ECCS (Operating) of NEDC-32988-A, "Technical Justification to Support Risk-Informed Modification to Selected Required Action End States for BWR Plants") of the core damage risks of remaining in Mode 3 rather than going to Mode 4 is also applicable to Condition B of the BSEP TS 3.5.1.

## Regulatory Commitments

The following table identifies those actions committed to by Duke Energy in this document. Any other statements in this submittal are provided for information purposes and are not considered to be regulatory commitments. Please direct questions regarding these commitments to Mr. Lee Grzeck, Manager - Regulatory Affairs, at (910) 457-2487.

<b>Regulatory Commitments</b>	<b>Due Date / Event</b>
Duke Energy will follow the guidance established in Section 11 of NUMARC 93-01, "Industry Guidance for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," Nuclear Management and Resource Council, Revision 4A, April 2011.	Ongoing
Duke Energy will follow the guidance established in TSTF-IG-05-02, Revision 2, "Implementation Guidance for TSTF-423, Revision 1, 'Technical Specifications End States, NEDC-32988-A,'" with the exception that Duke Energy will follow Regulatory Guide (RG) 1.160 in lieu of RG 1.182, and Duke Energy will follow Revision 4A of NUMARC 93-01 in lieu of Revision 3 of NUMARC 93-01.	Upon implementation of amendment.