



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

March 10, 2017

Mr. William R. Gideon
Site Vice President
Brunswick Steam Electric Plant
8470 River Rd. SE (M/C BNP001)
Southport, NC 28461

SUBJECT: BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2 – ISSUANCE OF AMENDMENTS TO REVISE TECHNICAL SPECIFICATION SECTION 2.1.1.2, SAFETY LIMIT MINIMUM CRITICAL POWER RATIO (CAC NOS. MF8470 AND MF8471)

Dear Mr. Gideon:

The U.S. Nuclear Regulatory Commission (Commission) has issued the enclosed Amendment Nos. 272 to Renewed Facility Operating License No. DPR-71 and Amendment No. 300 to Renewed Facility Operating License No. DPR-62 for Brunswick Steam Electric Plant, Units 1 and 2. The amendments are in response to your application dated September 26, 2016.

The amendments change Technical Specification Section 2.1.1.2 to change safety limit minimum critical power ratio numeric values for both units.

A copy of the related Safety Evaluation is also enclosed. A Notice of Issuance will be included in the Commission's biweekly *Federal Register* Notice.

Sincerely,

A handwritten signature in black ink, appearing to read "Andrew Hon".

Andrew Hon, Project Manager
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-325 and 50-324

Enclosures:

1. Amendment No. 272 to License No. DPR-71
2. Amendment No. 300 to License No. DPR-62
3. Safety Evaluation

cc w/enclosures: Distribution via Listserv

SUBJECT: BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2 – ISSUANCE OF AMENDMENTS TO REVISE TECHNICAL SPECIFICATION SECTION 2.1.1.2, SAFETY LIMIT MINIMUM CRITICAL POWER RATIO (CAC NOS. MF8470 AND MF8471) DATED MARCH 10, 2017

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

DUKE ENERGY PROGRESS, LLC

DOCKET NO. 50-325

BRUNSWICK STEAM ELECTRIC PLANT, UNIT 1

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 272
Renewed License No. DPR-71

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment filed by Duke Energy Progress, LLC (the licensee), dated September 26, 2016, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, the license is amended by changes to the Technical Specifications, as indicated in the attachment to this license amendment; and paragraph 2.C.(2) of Renewed Facility Operating License No. DPR-71 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 272, are hereby incorporated in the license. Duke Energy Progress, LLC shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance and shall be implemented for Unit 1 prior to start-up from the 2018 refueling outage (March 2018).

FOR THE NUCLEAR REGULATORY COMMISSION

Frank E. Seba

for

Benjamin. G. Beasley, Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Operating License
and Technical Specifications

Date of Issuance: March 10, 2017

ATTACHMENT TO LICENSE AMENDMENT NO. 272
BRUNSWICK STEAM ELECTRIC PLANT, UNIT 1
RENEWED FACILITY OPERATING LICENSE NO. DPR-71
DOCKET NO. 50-325

Replace page 6 of Renewed Facility Operating License No. DPR-71 with the attached page 6.

Replace the following page of the Appendix A Technical Specifications with the attached revised page. The revised page is identified by amendment number and contains marginal lines indicating the areas of change.

Remove Page
2.0-1

Insert Page
2.0-1

(c) Transition License Conditions

1. Before achieving full compliance with 10 CFR 50.48(c), as specified by 2. below, risk-informed changes to the licensee's fire protection program may not be made without prior NRC review and approval unless the change has been demonstrated to have no more than a minimal risk impact, as described in 2. above.
2. The licensee shall implement the modifications to its facility, as described in Table S-1, "Plant Modifications Committed," of Duke letter BSEP 14-0122, dated November 20, 2014, to complete the transition to full compliance with 10 CFR 50.48(c) by the startup of the second refueling outage for each unit after issuance of the safety evaluation. The licensee shall maintain appropriate compensatory measures in place until completion of these modifications.
3. The licensee shall complete all implementation items, except item 9, listed in LAR Attachment S, Table S-2, "Implementation Items," of Duke letter BSEP 14-0122, dated November 20, 2014, within 180 days after NRC approval unless the 180th day falls within an outage window; then, in that case, completion of the implementation items, except item 9, shall occur no later than 60 days after startup from that particular outage. The licensee shall complete implementation of LAR Attachment S, Table S-2, Item 9, within 180 days after the startup of the second refueling outage for each unit after issuance of the safety evaluation.

C. This renewed license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations in 10 CFR Chapter I: Part 20, Section 30.34 of Part 30, Section 40.41 of Part 40, Sections 50.54 and 50.59 of Part 50, and Section 70.32 of Part 70; and is subject to all applicable provisions hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

The licensee is authorized to operate the facility at steady state reactor core power levels not in excess of 2923 megawatts thermal.

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 272, are hereby incorporated in the license. Duke Energy Progress, LLC shall operate the facility in accordance with the Technical Specifications.

For Surveillance Requirements (SRs) that are new in Amendment 203 to Renewed Facility Operating License DPR-71, the first performance is due at the end of the first surveillance interval that begins at implementation of Amendment 203. For SRs that existed prior to Amendment 203, including SRs with modified acceptance criteria and SRs whose frequency of

2.0 SAFETY LIMITS (SLS)

2.1 SLs

2.1.1 Reactor Core SLs

2.1.1.1 With the reactor steam dome pressure < 785 psig or core flow < 10% rated core flow:

THERMAL POWER shall be $\leq 23\%$ RTP.

2.1.1.2 With the reactor steam dome pressure ≥ 785 psig and core flow $\geq 10\%$ rated core flow:

MCPR shall be ≥ 1.07 for two recirculation loop operation or ≥ 1.09 for single recirculation loop operation.

2.1.1.3 Reactor vessel water level shall be greater than the top of active irradiated fuel.

2.1.2 Reactor Coolant System Pressure SL

Reactor steam dome pressure shall be ≤ 1325 psig.

2.2 SL Violations

With any SL violation, the following actions shall be completed within 2 hours:

2.2.1 Restore compliance with all SLs; and

2.2.2 Insert all insertable control rods.



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

DUKE ENERGY PROGRESS, LLC

DOCKET NO. 50-324

BRUNSWICK STEAM ELECTRIC PLANT, UNIT 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 300
Renewed License No. DPR-62

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment filed by Carolina Power & Light Company (the licensee), dated September 26, 2016, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment; and paragraph 2.C.(2) of Renewed Facility Operating License No. DPR-62 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 300, are hereby incorporated in the license. Duke Energy Progress, LLC shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance and shall be implemented for Unit 2 prior to start-up from the 2017 refueling outage.

FOR THE NUCLEAR REGULATORY COMMISSION

Parideh E. Sabo

for Benjamin G. Beasley, Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Operating License
and Technical Specifications

Date of Issuance: March 10, 2017

ATTACHMENT TO LICENSE AMENDMENT NO. 300

BRUNSWICK STEAM ELECTRIC PLANT, UNIT 2

FACILITY OPERATING LICENSE NO. DPR-62

DOCKET NO. 50-324

Replace page 6 of Renewed Facility Operating License No. DPR-62 with the attached page 6.

Replace the following page of the Appendix A Technical Specifications with the attached revised page. The revised page is identified by amendment number and contains marginal lines indicating the areas of change.

Remove Page
2.0-1

Insert Page
2.0-1

(c) Transition License Conditions

1. Before achieving full compliance with 10 CFR 50.48(c), as specified by 2. below, risk-informed changes to the licensee's fire protection program may not be made without prior NRC review and approval unless the change has been demonstrated to have no more than a minimal risk impact, as described in 2. above.
2. The licensee shall implement the modifications to its facility, as described in Table S-1, "Plant Modifications Committed," of Duke letter BSEP 14-0122, dated November 20, 2014, to complete the transition to full compliance with 10 CFR 50.48(c) by the startup of the second refueling outage for each unit after issuance of the safety evaluation. The licensee shall maintain appropriate compensatory measures in place until completion of these modifications.
3. The licensee shall complete all implementation items, except Item 9, listed in LAR Attachment S, Table S-2, "Implementation Items," of Duke letter BSEP 14-0122, dated November 20, 2014, within 180 days after NRC approval unless the 180th day falls within an outage window; then, in that case, completion of the implementation items, except item 9, shall occur no later than 60 days after startup from that particular outage. The licensee shall complete implementation of LAR Attachment S, Table S-2, Item 9, within 180 days after the startup of the second refueling outage for each unit after issuance of the safety evaluation.

C. This renewed license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations in 10 CFR Chapter I: Part 20, Section 30.34 of Part 30, Section 40.41 of Part 40, Sections 50.54 and 50.59 of Part 50, and Section 70.32 of Part 70; is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

The licensee is authorized to operate the facility at steady state reactor core power levels not in excess of 2923 megawatts (thermal).

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 300, are hereby incorporated in the license. Duke Energy Progress, LLC shall operate the facility in accordance with the Technical Specifications.

For Surveillance Requirements (SRs) that are new in Amendment 233 to Renewed Facility Operating License DPR-62, the first performance is due at the end of the first surveillance interval that begins at implementation of Amendment 233. For SRs that existed prior to Amendment 233,

2.0 SAFETY LIMITS (SLS)

2.1 SLs

2.1.1 Reactor Core SLs

2.1.1.1 With the reactor steam dome pressure < 785 psig or core flow < 10% rated core flow:

THERMAL POWER shall be $\leq 23\%$ RTP.

2.1.1.2 With the reactor steam dome pressure ≥ 785 psig and core flow $\geq 10\%$ rated core flow:

MCPR shall be ≥ 1.07 for two recirculation loop operation or ≥ 1.09 for single recirculation loop operation.

2.1.1.3 Reactor vessel water level shall be greater than the top of active irradiated fuel.

2.1.2 Reactor Coolant System Pressure SL

Reactor steam dome pressure shall be ≤ 1325 psig.

2.2 SL Violations

With any SL violation, the following actions shall be completed within 2 hours:

2.2.1 Restore compliance with all SLs; and

2.2.2 Insert all insertable control rods.



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NOS. 272 AND 300

TO RENEWED FACILITY OPERATING LICENSES NOS. DPR-71 AND DPR-62

DUKE ENERGY PROGRESS, LLC

BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2

DOCKET NOS. 50-325 AND 50-324

1.0 INTRODUCTION

By letter dated September 26, 2016 (Reference 1), Duke Energy (the licensee) requested amendments to Renewed Facility Operating License Nos. DPR-71 and DPR-62 for the Brunswick Steam Electric Plant (BSEP), Units 1 and 2, respectively. The proposed amendments would modify Technical Specification (TS) Section 2.1.1.2 to change safety limit minimum critical power ratio (SLMCPR) numeric values for both units. The proposed changes would lower the numeric values of SLMCPR from 1.08 to 1.07 for two recirculation loop operation (TLO), and from 1.11 to 1.09 for single recirculation loop operation (SLO).

The U.S. Nuclear Regulatory Commission (NRC or the Commission) staff's original proposed no significant hazards consideration determination was published in the *Federal Register* on December 20, 2016 (81 FR 92866).

The NRC staff finds that the licensee's proposed amendments to update the TSs to include cycle-specific SLMCPR numeric values is based on NRC-approved methodologies that have been approved for use with AREVA fuel. The details of the review is discussed as follow:

2.0 REGULATORY EVALUATION

2.1 Proposed Changes

On the basis of the calculations for BSEP core reload analysis for Unit 1 Cycle 21, and Unit 2 Cycle 23, the calculated SLMCPR would change from ≥ 1.08 to ≥ 1.07 for TLO, and SLMCPR would change from ≥ 1.11 to ≥ 1.09 for SLO. Accordingly, the licensee proposes to revise both BSEP, Units 1 and 2, TS Section 2.1.1.2 to read as follows:

MCPR shall be > 1.07 for two recirculation loop operation or > 1.09 for single recirculation loop operation.

2.2 Regulations and Guidance

The regulatory requirements and guidance documents that the NRC staff considered in its review of the proposed amendments included the following:

- Section 182a of the Atomic Energy Act requires applicants for nuclear power plant operating licenses to include TSs as part of the license. The TSs ensure the operational capability of structures, systems, and components that are required to protect the health and safety of the public. The NRC's regulatory requirements related to the content of the TSs are contained in Section 50.36, "Technical specifications," of Title 10 of the *Code of Federal Regulations* (10 CFR), which requires that the TSs include items in the following specific categories: (1) safety limits, limiting safety systems settings, and limiting control settings; (2) limiting condition for operation; (3) surveillance requirements; (4) design features; and (5) administrative controls. However, the regulation does not specify the particular requirements to be included in TSs.
- The regulations in 10 CFR 50.36(c)(1)(i)(A) state, in part, that:

Safety limits for nuclear reactors are limits upon important process variables that are found to be necessary to reasonably protect the integrity of certain of the physical barriers that guard against the uncontrolled release of radioactivity.
- 10 CFR 50.36(c)(1) requires that power reactor facility TSs include safety limits (SLs) for process variables that protect the integrity of certain physical barriers that guard against the uncontrolled release of radioactivity.
- The fuel cladding is one of the physical barriers that separate the radioactive materials from the environment. The SLMCPR is an SL that is required to be in TSs to ensure that fuel design limits are not exceeded. The SLMCPR limit is contained in BSEP TS Section 2.1.1.2, and it can vary from cycle to cycle.
- General Design Criterion (GDC) 10, "Reactor design," of Appendix A to 10 CFR Part 50 states that the reactor core and associated coolant, control, and protection systems shall be designed with appropriate margin to assure that specified acceptable fuel design limits (SAFDLs) are not exceeded. The purpose of the SLMCPR is to ensure that SAFDLs are not exceeded during steady state operation and analyzed transients.

Guidance on the acceptability of the reactivity control systems, the reactor core, and fuel system design is provided in NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition" (SRP). Specifically, SRP Section 4.2, Revision 2, "Fuel System Design" (Reference 2), specifies all fuel damage criteria for evaluation of whether fuel designs meet the SAFDLs. SRP Section 4.4, "Thermal and Hydraulic Design" (Reference 3) provides guidance on the review of thermal-hydraulic design in meeting the requirement of GDC 10 and the fuel design criteria established in SRP Section 4.2. It states that the critical power ratio (CPR) is to be established such that at least 99.9 percent of fuel rods in the core would not be expected to experience departure from nucleate boiling or boiling transition during normal operation or anticipated operational occurrences.

3.0 TECHNICAL EVALUATION

The SLMCPR numeric values in BSEP TS Section 2.1.1.2 are SLs. The SLMCPR limit is established such that at least 99.9 percent of the fuel rods in the core would not be expected to experience the onset of transition boiling as a result of normal operation and transients, which in turn ensures fuel cladding damage does not occur. The SLMCPR limit is established such that fuel design limits are not exceeded during steady state operation, normal operational transients, and abnormal operational transients. As such, fuel damage is calculated not to occur if the limit is not violated. However, because fuel damage is not directly observable, a step-back approach is used to establish corresponding operating limits. The operating limit minimum critical power ratio (OLMCPR) is established by summing the cycle-specific core reload transient analyses adds and the calculated SLMCPR values. The OLMCPR is required to be established and documented in the core operating limits report (COLR) for each reload cycle by BSEP TS 5.6.5, "Core Operating Limits Report (COLR)."

The absolute value of SLMCPR tends to vary cycle to cycle, typically due to the introduction of improved fuel bundle types, changes in fuel vendors or applicable computer codes, and changes in core loading pattern. Following the determination of the cycle-specific SLMCPR values, the OLMCPR values are derived. The cycle-specific SLMCPR numeric values are listed in BSEP TS Section 2.1.1.2 and, therefore, must be revised using the license amendment process.

The BSEP SLMCPR calculation was performed by AREVA Inc. (AREVA), and the results were provided in Enclosure 6 of the license amendment request (LAR). The calculation used NRC-approved methodologies and uncertainties, as documented in the following topical reports (TRs):

- ANP-10307NPA, Revision 0, "AREVA MCPR Safety Limit Methodology for Boiling Water Reactors," AREVA NP, June 2011 (Reference 4)
- ANP-10298PA, Revision 1, "ACE/ATRIUM 10XM Critical Power Correlation," AREVA NP, March 2014 (Reference 5)
- BAW-10247PA, Revision 0, "Realistic Thermal-Mechanical Fuel Rod Methodology for Boiling Water Reactors," AREVA NP, February 2008 (Reference 6)
- EMF-2158(P)(A), Revision 0, "Siemens Power Corporation Methodology for Boiling Water Reactors: Evaluation and Validation of CASMO-4 I MICROBURN-B2," Siemens Power Corporation, October 1999 (Reference 7)

These methodologies were used for the BSEP, Unit 1 Cycle 21 and Unit 2 Cycle 23, SLMCPR calculations. The NRC staff reviewed the proposed changes to ensure that the generic methods were appropriately applied to BSEP. The BSEP, Unit 1 Cycle 21 core is made up of ATRIUM 10XM fuel and the BSEP, Unit 2 Cycle 23 core is made up of ATRIUM 10XM fuel and eight ATRIUM 11 lead test assemblies (LTAs). No plant hardware or operational changes are required with this proposed change.

By letter dated June 14, 2011 (Reference 8), the NRC staff provided its final safety evaluation (SE) regarding plant-specific application of the NRC-approved methodology described in ANP-10307NPA, Revision 0. The SE identified a concern related to the channel bow model. In

order to address the NRC staff-identified concern regarding channel bow model, the BSEP licensee proposed the following license condition for Units 1 and 2, and it was incorporated in BSEP TS Appendix B as an additional condition:

The fuel channel bow standard deviation component of the channel bow model uncertainty used by ANP-10307PA, *AREVA MCPR Safety Limit Methodology for Boiling Water Reactors* (i.e., TS 5.6.5.b.11) to determine the Safety Limit Minimum Critical Power Ratio shall be increased by the ratio of channel fluence gradient to the nearest channel fluence gradient bound of the channel measurement database, when applied to channels with fluence gradients outside the bounds of the measurement database from which the model uncertainty is determined.

In accordance with the requirements of the license condition, the licensee addressed the channel bow issue by calculating fast fluence gradients for the BSEP, Unit 1 Cycle 21 and Unit 2 Cycle 23 core designs and compared it to the upper and lower bounds of the channel bow database. The Unit 1 Cycle 21 and Unit 2 Cycle 23 reference core designs remain bounded by the upper/lower bound of the channel bow database, except for a small number of assemblies in Unit 1 Cycle 21 and in Unit 2 Cycle 23, as described in Enclosure 6 of the LAR. The channel bow model uncertainty for the assemblies that experience fluence gradients outside the bounds of the measurement database was augmented with the process consistent with that of the NRC staff's June 14, 2011 final SE (Reference 8). Based on the review of the licensee's submittals, the NRC staff concludes that the licensee has appropriately addressed this restriction imposed on application of this SLMCPR methodology at BSEP, Units 1 and 2, in accordance with the requirements of the NRC staff's March 1, 2013, SE issued with BSEP, Units 1 and 2, Amendment Nos. 262 and 290 (Reference 9).

The ACE/ATRIUM 10XM critical power correlation (Reference 5) is used for the ATRIUM 10XM fuel while the Siemens Power Corporation BWR (SPCB) critical power correlation (Reference 10) is used for the ATRIUM 11 LTAs. The SPCB and ACE/ATRIUM 10XM critical power correlation limit of applicability for local peaking factor is provided as an NRC safety evaluation report (SER) restriction when the correlations were approved. Fuel that are expected to be resident in BSEP Unit 1 Cycle 21 and BSEP Unit 2 Cycle 23 cores was designed to be below this limit. Therefore, based on the information provided by the licensee, the NRC staff finds that the licensee has demonstrated that this SER restriction is satisfied.

BSEP TS 4.2.1, "Fuel Assemblies" requires that a limited number of LTAs that have not completed representative testing may be placed in non-limiting core regions. Since BSEP Unit 2 Cycle 23 will contain eight ATRIUM 11 LTAs, the NRC staff expects that these LTAs will be placed in non-limiting core location as required by the BSEP TS 4.2.1.

On the basis of the analysis performed by AREVA using the NRC-approved methodologies described above, the licensee has proposed to amend the BSEP, Units 1 and 2, TS Section 2.1.1.2 to revise the SLMCPR. The SLMCPR analyses were performed for BSEP maximum extended load line limit analysis operation at the rated power. The current required SLMCPR values in BSEP TSs is 1.08 for TLO and 1.11 for SLO. Calculations performed by AREVA for BSEP, Units 1 and 2, resulted in a minimum calculated value of SLMCPR to be 1.07 for TLO, and 1.09 for SLO. AREVA's calculation of the revised plant-specific SLMCPR numeric values for BSEP was performed as part of the reload licensing analysis for BSEP and is based upon NRC-approved methods and, therefore, is acceptable.

No departures from NRC-approved methodologies or deviations from NRC-approved calculational uncertainties were identified in the BSEP SLMCPR calculations.

The NRC staff verified that the proposed changes would continue to meet the applicable regulations and requirements and that the analysis performed to calculate the BSEP, Units 1 and 2, SLMCPR numeric values was based upon NRC-approved methodologies. The NRC staff concludes that the SLMCPR will continue to provide assurance that 99.9 percent of the fuel rods in the core will not exceed the CPR and that fuel cladding integrity will be maintained under conditions of normal operation and with appropriate margin for anticipated operational occurrences.

3.1 Technical Evaluation Conclusion

The NRC staff finds that the licensee's proposed amendments to update the TSs to include cycle-specific SLMCPR numeric values is based on NRC-approved methodologies that have been approved for use with AREVA fuel and that the staff SER restrictions were appropriately satisfied, without any departures or deviations. The amendments are consistent with the regulatory requirements and guidance as discussed in Section 2.0 of this SE and, therefore, are acceptable. The NRC staff determined that the changes do not require any exemptions or relief from regulatory requirements. Defense-in-depth and sufficient safety margins will continue to be maintained. Therefore, based on the above considerations, the proposed changes to revise the SLMCPR values are acceptable. The licensee is authorized to change the SLMCPR in TS Section 2.1.1.2 from 1.08 to 1.07 for TLO, and from 1.11 to 1.09 for SLO, at steam dome pressures greater than or equal to 785 pounds per square inch gauge (psig) and at core flows greater than or equal to 10 percent of rated core flow.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the State of North Carolina official was notified of the proposed issuance of the amendments on March 9, 2017. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on such finding (82 FR 92866). Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) there is reasonable assurance that such activities will be

conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

7.0 REFERENCES

1. Letter from William Gideon, Duke Energy, to NRC Document Control Desk, "Brunswick Steam Electric Plant, Unit Nos. 1 and 2, Request for License Amendment – Revision to Technical Specification 2.1.1.2 Minimum Critical Power Ratio Safety Limit," dated September 26, 2016 (Agencywide Documents Access and Management System (ADAMS) Package Accession No. ML16287A440).
2. SRP Section 4.2, Revision 2, "Fuel System Design (NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition") (ADAMS Accession No. ML070740002).
3. SRP Section 4.4, "Thermal and Hydraulic Design" (NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition") (ADAMS Accession No. ML070550060).
4. ANP-10307NPA, Revision 0, "AREVA MCPR Safety Limit Methodology for Boiling Water Reactors," AREVA NP, June 2011 (ADAMS Accession No. ML11259A021).
5. ANP-10298PA, Revision 1, "ACE/ATRIUM 10XM Critical Power Correlation," AREVA NP, March 2014 (ADAMS Accession No. ML14183A734).
6. BAW-10247PA, Revision 0, "Realistic Thermal-Mechanical Fuel Rod Methodology for Boiling Water Reactors," AREVA NP, February 2008 (ADAMS Accession No. ML081340208).
7. EMF-2158(P)(A), Revision 0, "Siemens Power Corporation Methodology for Boiling Water Reactors: Evaluation and Validation of CASMO-4 I MICROBURN-B2," Siemens Power Corporation, October 1999 (ADAMS Accession No. ML003698495).
8. Letter from Robert Nelson, NRC, to Pedro Salas, AREVA NP Inc., "Final Safety Evaluation for AREVA NP, Inc. Topical Report ANP-10307P, Revision 0, "AREVA MCPR [Minimum Critical Power Ratio] Safety Limit Methodology for Boiling Water Reactors," dated June 14, 2011 (ADAMS Accession No. ML11140A125)
9. Letter from Christopher Gratton, NRC to Michael J. Annacone, Duke Energy, " Brunswick Steam Electric Plant, Units 1 and 2 - Issuance of Amendments Regarding Addition of Analytical Methodology Topical Reports to Technical Specification 5.6.5 and Revision to Minimum Critical Power Ratio Safety Limit," dated March 1, 2013 (ADAMS Accession No. ML13037A551).
10. EMF-2209(NP)(A), Revision 3, "SPCB Critical Power Correlation," AREVA NP, September 2009 (ADAMS Accession No. ML093650235).

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