Progress Energy

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OCT 3 1 2003

SERIAL: BSEP 03-0148
TSC-2003-07

10 CFR 50.90

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

SUBJECT: Brunswick Steam Electric Plant, Unit No. 1
Docket No. 50-325/License No. DPR-71
Request for License Amendment
Technical Specification 2.1.1.2, Reactor Core Minimum Critical Power Ratio Safety Limit and Revision to References in Technical Specification 5.6.5, Core Operating Limits Report (COLR)

Ladies and Gentlemen:

In accordance with the Code of Federal Regulations, Title 10, Parts 50.90 and 2.101, Progress Energy Carolinas, Inc. (PEC) is requesting a revision to the Technical Specifications (TSs) for the Brunswick Steam Electric Plant (BSEP), Unit No. 1. A proposed change would revise the Operating License DPR-71 to incorporate revised minimum critical power ratio (MCPR) safety limit (SL) value for both two recirculation loop and single recirculation loop operation into TS 2.1.1.2.

Currently, TS 2.1.1.2, "Reactor Core SLs," requires the MCPR to be greater than or equal to 1.12 for two recirculation loop operation and to be greater than or equal to 1.14 for single recirculation loop operation. Beginning with the next operating cycle for Unit 1, the required MCPR is being revised to be greater than or equal to 1.11 for two recirculation loop operation and to be greater than or equal to 1.12 for single recirculation loop operation. By letter dated November 12, 2002 (i.e., Serial: BSEP 02-0169), PEC submitted a license amendment application to expand the core flow operating range (i.e., Maximum Extended Load Line Limit Analysis Plus (MELLLA+)). The revised MCPR safety limit values discussed herein are applicable to Cycle 15 operation both prior to and following implementation of the MELLLA+ core flow operating range expansion, although approval of MELLLA+ is not a prerequisite for approval of this amendment request.

A second proposed change adds topical report NEDE-32906P-A, "TRACG Application for Anticipated Operational Occurrences (AOO) Transient Analyses," to the list of documents in TS 5.6.5 describing the approved methodologies used to determine the core operating limits. General Electric Nuclear Energy (GENE) and its subsidiary Global Nuclear Fuel – Americas, LLC (GNF-A) submitted NEDE-32906P for NRC review and approval by letter

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dated January 25, 2000 [ADAMS Accession Number ML003680922]. NRC approval of NEDE-32906P was subsequently issued by letter dated October 22, 2001 [ADAMS Accession Number ML012770430]. By letter dated August 6, 2003, GENE submitted an update to NEDE-24011-P, "General Electric Standard Application for Reactor Fuel," to incorporate NEDE-32906P-A. If the NRC completes review and approval of the GENE update to NEDE-24011-P prior to issuance of this PEC license amendment request, the proposed change to TS 5.6.5 will not be needed.

An evaluation of the proposed license amendment is provided in Enclosure 1, and is supported by a GNF-A document in Enclosure 2. The GNF-A document provides a summary of analysis input parameters and results of a comparison of the revised Unit 1 Cycle 15 and previous Unit 1 Cycle 14 MCPR safety limit values.

Enclosure 2 contains information that GNF-A considers proprietary, as defined by 10 CFR 2.790. GNF-A, as the owner of the proprietary information, has executed the affidavit provided in Enclosure 3, which identifies that the enclosed proprietary information has been han 'led and classified as proprietary, is customarily held in confidence, and has been withheld from public disclosure. GNF-A requests that the enclosed proprietary information be withheld from public disclosure in accordance with the provisions of 10 CFR 2.790 and 9.17. A non-proprietary (i.e., redacted) version of the information is provided in Enclosure 4.

PEC has evaluated the proposed change in accordance with 10 CFR 50.91(a)(1), using the criteria in 10 CFR 50.92(c), and determined that this change involves no significant hazards considerations.

Unit 1 will be unable to resume power operation without receipt of approval for the revised MCPR safety limit values in Technical Specification 2.1.1.2 or the added methodology to Technical Specification 5.6.5. Therefore, the NRC is requested to issue the requested license amendment no later than February 28, 2004. PEC requests that the amendment, once approved, be issued effective immediately, to be implemented prior to resuming operation from Unit 1 Refueling Outage 14 for Cycle 15.

In accordance with 10 CFR 50.91(b), PEC is providing the State of North Carolina a copy of the proposed license amendment.

Please refer any questions regarding this submittal to Mr. Edward T. O'Neil, Manager – Support Services, at (910) 457-3512.

Sincerely,

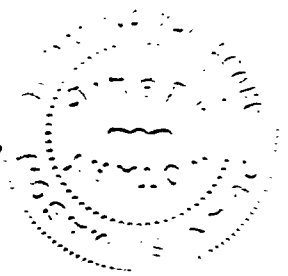
John S. Keenan

WRM/wrm

Enclosures:

1. Evaluation of Proposed License Amendment Request
2. Global Nuclear Fuel – Americas, LLC Document Entitled "Additional Information Regarding the Cycle Specific SLMCPR for Brunswick Unit 1 Cycle 15" dated September 26, 2003 **(Proprietary Information)**
3. Global Nuclear Fuel – Americas, LLC Affidavit Regarding Withholding from Public Disclosure
4. Non-Proprietary Version of Global Nuclear Fuel – Americas, LLC Document Entitled "Additional Information Regarding the Cycle Specific SLMCPR for Brunswick Unit 1 Cycle 15" dated September 26, 2003
5. Marked-up Technical Specification Pages - Unit 1
6. Typed Technical Specification Pages - Unit 1
7. Marked-up Technical Specification Bases Pages – Unit 1 (For Information Only)
8. List of Regulatory Commitments

John S. Keenan, having been first duly sworn, did depose and say that the information contained herein is true and correct to the best of his information, knowledge and belief; and the sources of his information are officers, employees, and agents of Carolina Power & Light Company.



Dean S. Mason
Notary (Seal)

My commission expires: August 29, 2004

cc (with enclosures):

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Evaluation of Proposed License Amendment Request

Subject: Technical Specification 2.1.1.2, Reactor Core Minimum Critical Power Ratio Safety Limit and Revision to References in Technical Specification 5.6.5, Core Operating Limits Report (COLR)

1.0 Description

This letter is a request to amend Operating License DPR-71 for the Brunswick Steam Electric Plant (BSEP), Unit No. 1.

Proposed Change 1

The proposed change revises Technical Specification (TS) 2.1.1.2 to incorporate a revised minimum critical power ratio (MCPR) safety limit value for both two recirculation loop and single recirculation loop operation. Currently, TS 2.1.1.2, "Reactor Core SLs," requires the MCPR to be greater than or equal to 1.12 for two recirculation loop operation and to be greater than or equal to 1.14 for single recirculation loop operation. Beginning with the next operating cycle for Unit 1, the required MCPR is being revised to be greater than or equal to 1.11 for two recirculation loop operation and to be greater than or equal to 1.12 for single recirculation loop operation.

Unit 1 will be unable to resume power operation following the Refueling Outage 14 for Cycle 15 without receipt of approval for the revised MCPR safety limit values in TS 2.1.1.2. Therefore, the NRC is requested to issue the requested license amendment no later than February 28, 2004.

Proposed Change 2

The proposed change adds topical report NEDE-32906P-A, "TRACG Application for Anticipated Operational Occurrences (AOO) Transient Analyses," to the list of documents specified in TS 5.6.5 describing the approved methodologies used to determine the core operating limits. General Electric Nuclear Energy (GENE) and its subsidiary Global Nuclear Fuel – Americas, LLC (GNF-A) submitted NEDE-32906P for NRC review and approval by letter dated January 25, 2000 (i.e., Reference 3). NRC approval of NEDE-32906P was subsequently issued by letter dated October 22, 2001 (i.e., Reference 4). By letter dated August 6, 2003, GENE submitted an update to NEDE-24011-P, "General Electric Standard Application for Reactor Fuel," to incorporate NEDE-32906P-A. If the NRC completes review and approval of the GENE update to NEDE-24011-P-A prior to issuance of this PEC license amendment, the proposed change to TS 5.6.5 will not be needed.

2.0 Proposed Changes

Proposed Change 1

The proposed change revises Operating License DPR-71 to incorporate a revised MCPR safety limit value for both two recirculation loop and single recirculation loop operation. Currently, TS 2.1.1.2 requires the MCPR to be greater than or equal to 1.12 for two recirculation loop operation and to be greater than or equal to 1.14 for single recirculation loop operation. The proposed amendment revises the MCPR safety limit values contained in TS 2.1.1.2 from 1.12 to 1.11 for two recirculation loop operation and from 1.14 to 1.12 for single recirculation loop operation. The MCPR safety limit values are being revised for Unit 1 based on the loading of new reload GE14 fuel bundles. The specific wording of the proposed changes follows; changes made to existing conditions are bolded.

2.0 SAFETY LIMITS (SLs)

2.1 SLs

2.1.1 Reactor Core SLs

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

MCPR shall be ≥ **1.11** for two recirculation loop operation or ≥ **1.12** for single recirculation loop operation.

Proposed Change 2

The proposed change revises Operating License DPR-71 to add GENE topical report NEDE-32906P-A as an approved analytical method for determining core operating limits. Currently, TS 5.6.5.b requires that the listed analytical methods, which have been previously reviewed and approved by the NRC, be used to determine the core operating limits. At present, only the latest approved version of GENE Report NEDE-24011-P-A, otherwise referred to as GESTAR-II, is listed.

The proposed change revises Technical Specification 5.6.5.b to add GENE topical report NEDE-32906P-A. This document describes the application of the TRACG computer code for determining core operating limits for AOO transient analyses. The specific wording of the proposed change follows; the change made is bolded.

5.6.5 CORE OPERATING LIMITS REPORT (COLR)

b. The analytical methods used to determine the core operating limits shall be those previously reviewed and approved by the NRC, specifically those described in the following documents:

1. NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel," (latest approved version).

2. **NEDE-32906P-A, "TRACG Application for Anticipated Operational Occurrences (AOO) Transient Analyses," approved version as specified in the COLR.**

This change is being requested because the NRC has not yet approved GENE's request to incorporate the use of NEDE-32906P-A into NEDE-24011-P-A. If the NRC completes review and approval of the GENE update to NEDE-24011-P-A prior to issuance of the PEC license amendment, the proposed change to TS 5.6.5.b will not be needed.

3.0 Background

Proposed Change 1

Technical Specification 2.1.1.2 establishes MCPR Safety Limit values, which if met, ensure that no mechanistic fuel damage is calculated to occur. Since the parameters which result in fuel damage are not directly observable during reactor operation, the thermal and hydraulic conditions resulting in a departure from nucleate boiling (i.e., transition boiling) have been used to designate the beginning of the region where fuel damage could occur. Although it is recognized that a departure from nucleate boiling would not necessarily result in damage to boiling water reactor fuel rods, the critical power at which boiling transition is calculated to occur has been adopted as a convenient limit. The MCPR Safety Limit is defined as the critical power ratio, in the limiting fuel assembly, for which more than 99.9 percent of the fuel rods in the core are expected to avoid boiling transition, considering the power distribution within the core and all uncertainties.

The design process for each operating cycle core involves verification that appropriate safety limit values for the MCPR exist. Unit 1 Cycle 14 was the first operating cycle involving the loading of the GE14 fuel. For Unit 1 Cycle 14, the core design also required the MCPR Safety Limit values in Technical Specification 2.1.1.2 to be revised. For Cycle 15, additional GE14 fuel is being used in the core design as a replacement for some currently loaded GE13 fuel. Evaluation of the Unit 1 Cycle 15 core design has determined that a revision of the MCPR Safety Limit values is necessary.

Proposed Change 2

The MCPR Safety Limit analysis is the first in a series of analyses that assure the new core loading for Unit 1 Cycle 15 is operated in a safe manner. Prior to the startup of Unit 1 for

Cycle 15, other licensing analyses are performed, using NRC approved methodologies referenced in TS Section 5.6.5.b, to determine changes in core operating limits as a result of anticipated operational occurrences. These results are combined with the MCPR Safety Limit values to generate the MCPR operating limits contained in the Unit 1 Cycle 15 COLR. The COLR operating limits assure that the MCPR Safety Limit will not be exceeded during normal operation or anticipated operational occurrences, thus providing the required protection for the fuel rod cladding.

A reference is being added to TS Section 5.6.5.b. The reference lists GENE topical report NEDE-32906P-A as an approved analytical methodology for determining core operating limits. NEDE-32906P-A has been previously reviewed and approved by the NRC. The NRC review is documented in a letter dated October 22, 2001 (i.e., Reference 4). By letter dated August 6, 2003, GENE submitted an update to NEDE-24011-P to incorporate NEDE-32906P-A.

The addition of this reference is consistent with the process established in NRC Generic Letter 88-16, "Removal of Cycle-Specific Parameter Limits from Technical Specifications." Generic Letter 88-16 provides guidance on modifying cycle-specific parameter limits in the TS. The proposed change to TS 5.6.5 adding NEDE-32906P-A to the list of documents describing approved methodologies for determining core operating limits is in compliance with the guidance specified in Generic Letter 88-16.

Need for Change

PEC requests issuance of the proposed amendment by February 28, 2004, to support the startup of Unit 1 following Refueling Outage 14. This outage is scheduled to begin on February 28, 2004.

4.0 Technical Analysis

Proposed Change 1

The GNF-A methodology for MCPR Safety Limit determination for each fuel design is contained in topical report NEDE-24011-P-A, Revision 14, and U.S. Supplement, NEDE-24011-P-A-14-US, June 2000, which incorporates Amendment 26. To address NRC concerns relating to the methodologies and procedures for determining cycle-specific MCPR Safety Limits, GNF-A (i.e., under the corporate name of General Electric) submitted several topical reports for NRC review and approval. These topical reports include: (1) a description of the procedures used to account for the reload-specific core design and operation in determining the cycle-specific MCPR Safety Limit in NEDC-32601P, "Methodology and Uncertainties for Safety Limit MCPR Evaluations;" (2) the power distribution uncertainty for the new General Electric 3D-MONICORE core surveillance system in NEDC-32694P, "Power Distribution Uncertainties for Safety Limit MCPR Evaluation;" and (3) the methodology and uncertainties required for the implementation of cycle-specific MCPR Safety Limits in Amendment 26 to

NEDE-24011-P-A. By letters dated November 10, 1999, and March 29, 2000 (i.e., References 5 and 6), the NRC approved the use of Amendment 26 to NEDE-24011-P-A.

The revised MCPR Safety Limit analysis for BSEP, Unit 1 has been performed by GNF-A using the NRC-approved methods and procedures described in topical report NEDE-24011-P-A. Use of the NRC-approved methods ensures that the resulting MCPR Safety Limit values satisfy the fuel design safety criterion that more than 99.9 percent of the fuel rods in the core avoid boiling transition if the safety limit is not violated. As a result, the proposed MCPR Safety Limit value changes do not adversely impact any safety analysis assumptions or results. A summary of the relevant input parameters and results of a comparison of the revised Unit 1 Cycle 15 and previous Unit 1 Cycle 14 MCPR Safety Limit values is provided in Enclosure 2.

By letter dated November 12, 2002 (i.e., Serial: BSEP 02-0169), PEC submitted a license amendment application to expand the core flow operating range (i.e., Maximum Extended Load Line Limit Analysis Plus (MELLLA+)). The revised MCPR safety limit values discussed herein are applicable to Cycle 15 operation both prior to and following implementation of the MELLLA+ core flow operating range expansion, although approval of MELLLA+ is not a prerequisite for approval of this proposed change.

Proposed Change 2

The existing methodologies for determining core operating limits have multiple, additive uncertainties and result in overly conservative operating limits. In order to eliminate the excessive conservatisms associated with these multiple uncertainties, for Unit 1 Cycle 15, the TRACG thermal-hydraulic analysis code is being used. TRACG is a multi-dimensional, two-fluid reactor thermal-hydraulics code with three-dimensional neutron kinetics capability. The version of TRACG being used for determining the Unit 1 Cycle 15 core operating limits is described in topical report NEDE-32906P. GENE and its subsidiary GNF-A submitted NEDE-32906P for NRC review and approval by letter dated January 25, 2000 (i.e., Reference 3). NRC approval of NEDE-32906P was subsequently issued by letter dated October 22, 2001 (i.e., Reference 4).

Currently, TS 5.6.5 lists only one approved methodology, NEDE-24011-P-A, for the determination of core operating limits. By letter dated August 6, 2003, GENE submitted an update to NEDE-24011-P to incorporate NEDE-32906P-A. However, because the NRC has not yet completed review and approval of the update to NEDE-24011-P, and because PEC is using these methods for determining core operating limits for Unit 1 Cycle 15, PEC is requesting a change to TS 5.6.5.b to add the NRC-approved TRACG topic report to the list of approved methodologies for determining core operating limits.

5.0 Regulatory Safety Analysis

5.1 No Significant Hazards Consideration

PEC has evaluated whether or not a significant hazards consideration is involved with the proposed amendments by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

   Response: No

   Proposed Change 1

   The proposed change to Technical Specification 2.1.1.2 does not alter the assumptions of the accident analyses or the Technical Specification Bases. The MCPR Safety Limit values are calculated to ensure that greater than 99.9 percent of the fuel rods in the core avoid transition boiling during any plant operation if the safety limit is not violated. The derivation of the MCPR Safety Limit values specified in the Technical Specifications has been performed using the methods discussed in "General Electric Standard Application for Reactor Fuel," NEDE-24011-P-A-14 (i.e., GESTAR-II), and U.S. Supplement, NEDE-24011-P-A-14-US, June 2000, which incorporates Amendment 26. By letters dated November 10, 1999, and March 29, 2000, GNF, the NRC approved the use of Amendment 26 to NEDE-24011-P-A. Appropriate operational MCPR limits are applied that ensure the MCPR Safety Limit is not exceeded during all modes of operation and anticipated operational occurrences.

   The revised MCPR Safety Limit values do not affect the operability of any plant systems nor do these revised values compromise any fuel performance limits; therefore, the probability of fuel damage will not be increased as a result of this change. The MCPR Safety Limit values do not impact the source term or pathways assumed in accidents previously evaluated, and there are no adverse effects on the factors contributing to offsite or onsite radiological doses. In addition, the revised MCPR Safety Limit values do not affect the performance of any equipment used to mitigate the consequences of a previously evaluated accident and do not affect setpoints that initiate protective or mitigative actions.

   Therefore, the proposed change to MCPR Safety Limit values contained in Technical Specification 2.1.1.2 does not involve a significant increase in the probability or consequences of an accident previously evaluated.

   Proposed Change 2

   The proposed change to TS 5.6.5 will add General Electric Nuclear Energy topical report NEDE-32906P-A, "TRACG Application for Anticipated Operational Occurrences (AOO)

Transient Analyses," to the list of documents describing approved methodologies for determining core operating limits. Analyzed events are assumed to be initiated by the failure of plant structures, systems, or components. The core operating limits, which are developed using the topical report being added, ensure that the integrity of the fuel will be maintained during normal operations and that design requirements will continue to be met. The proposed change does not involve physical changes to any plant structure, system, or component. Therefore, the probability of occurrence for a previously analyzed accident is not significantly increased.

The consequences of a previously analyzed accident are dependent on the initial conditions assumed for the analysis, the behavior of the fuel during the analyzed accident, the availability and successful functioning of the equipment assumed to operate in response to the analyzed event, and the setpoints at which these actions are initiated. Use of the analytical methodologies described in the topical report being added to TS 5.6.5 will ensure that applicable design and safety analyses acceptance criteria are met. Use of these NRC-approved methodologies does not affect the performance of any equipment used to mitigate the consequences of an analyzed accident. As a result, no analysis assumptions are violated and there are no adverse effects on the factors that contribute to offsite or onsite dose as the result of an accident. Use of the approved methodologies described in the topical report being added to TS 5.6.5 ensures that plant structures, systems, or components are maintained consistent with the safety analysis and licensing bases. Based on this evaluation, there is no significant increase in the consequences of a previously analyzed event.

Therefore, the proposed change adding General Electric Nuclear Energy topical report NEDE-32906P-A to the TS 5.6.5 list of documents describing approved methodologies for determining core operating limits does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No

Proposed Change 1

Creation of the possibility of a new or different kind of accident would require the creation of one or more new precursors of that accident. New accident precursors may be created by modifications of the plant configuration, including changes in allowable modes of operation. The proposed revision of the MCPR Safety Limit values does not involve installation of any new or different equipment. No installed equipment is being operated in a different manner than currently evaluated. No new initiating events or transients will result from use of the revised MCPR Safety Limit values. As a result, no new failure modes are being introduced. Therefore, the proposed change to MCPR Safety Limit

values contained in Technical Specification 2.1.1.2 does not create the possibility of a new or different kind of accident from any accident previously evaluated.

Proposed Change 2

The proposed change adding topical report NEDE-32906P-A to TS 5.6.5, and the use of the analytical methods described therein, does not involve any physical alteration of plant systems, structures, or components, other than allowing for fuel and core designs in accordance with NRC approved methodologies. The proposed methodology continues to meet applicable criteria for core operating limit analysis. No new or different equipment is being installed. No installed equipment is being operated in a different manner. There is no alteration to the parameters within which the plant is normally operated or in the setpoints that initiate protective or mitigative actions. As a result no new failure modes are being introduced.

Therefore, the proposed change adding General Electric Nuclear Energy topical report NEDE-32906P-A to the TS 5.6.5 list of documents describing approved methodologies for determining core operating limits does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the proposed change involve a significant reduction in a margin of safety?

Response: No

Proposed Change 1

The margin of safety is established through the design of the plant structures, systems, and components; through the parameters within which the plant is operated; through the establishment of setpoints for actuation of equipment relied upon to respond to an event; and through margins contained within the safety analyses. The revised MCPR Safety Limit values will not adversely impact the performance of plant structures, systems, components, and setpoints relied upon to respond to mitigate an accident or transient. The MCPR Safety Limit values are calculated to ensure that greater than 99.9 percent of the fuel rods in the core avoid transition boiling during any anticipated operation occurrences if the safety limit is not violated, thereby ensuring that fuel cladding integrity is maintained. The revised MCPR Safety Limit values have been calculated using NRC approved methods and procedures and preserve the existing margin to transition boiling. Based on the assurance that the fuel design criteria are being met, the revised MCPR Safety Limit values do not involve a reduction in a margin of safety.

Proposed Change 2

The margin of safety is established through the design of the plant structures, systems, and components, through the parameters within which the plant is operated, through the

establishment of the setpoints for the actuation of equipment relied upon to respond to an event, and through margins contained within the safety analyses. The proposed change adding General Electric Nuclear Energy topical report NEDE-32906P-A to the TS 5.6.5 list of documents describing approved methodologies for determining core operating limits does not impact the condition or performance of structures, systems, setpoints, and components relied upon for accident mitigation. The proposed change does not significantly impact any safety analysis assumptions or results. Therefore, the proposed change adding topical report NEDE-32906P-A to the TS 5.6.5 list of documents describing approved methodologies for determining core operating limits does not result in a significant reduction in the margin of safety.

Based on the above, PEC concludes that the proposed amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

5.2 Applicable Regulatory Requirements/Criteria

The BSEP design was reviewed for construction under the "General Design Criteria for Nuclear Power Plant Construction" issued for comment by the AEC in July 1967 and is committed to meet the intent of the General Design Criteria (GDC), published in the Federal Register on May 21, 1971 as Appendix A to 10 CFR Part 50. Title 10 of the Code of Federal Regulations (10 CFR) establishes the fundamental regulatory requirements with respect to reactivity control systems. Specifically, GDC-10, "Reactor design," states, in part, 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 are not exceeded.

The proposed MCPR Safety Limit values in TS Section 2.1.1.2 will ensure that 99.9 percent of the fuel rods in the core are not expected to experience boiling transition. This satisfies the requirements of GDC-10 regarding acceptable fuel design limits.

NRC Generic Letter 88-16, "Removal of Cycle-Specific Parameter Limits from Technical Specifications," provides guidance on modifying cycle-specific parameter limits in TS. The proposed change to TS 5.6.5 adding GENE topical report NEDE-32906P-A to the list of documents describing approved methodologies for determining core operating limits is in compliance with the guidance specified in Generic Letter 88-16.

In conclusion, based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

6.0 Environmental Considerations

10 CFR 51.22(c)(9) identifies certain licensing and regulatory actions, which are eligible for categorical exclusion from the requirement to perform an environmental assessment. A proposed amendment to an operating license for a facility does not require an environmental assessment if operation of the facility in accordance with the proposed amendment would not: (1) involve a significant hazards consideration; (2) result in a significant change in the types or significant increase in the amounts of any effluents that may be released offsite; or (3) result in a significant increase in individual or cumulative occupational radiation exposure.

Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

7.0 References

Precedents

1. ML020870603: Letter from the U. S. Nuclear Regulatory Commission to Mr. J. S. Keenan, "Brunswick Steam Electric Plant, Unit 1 – Issuance of Amendment Regarding Revision of Safety Limit Minimum Critical Power Ratio (TAC No. MB2952)," dated March 22, 2002.

2. ML030870244: Letter from the U. S. Nuclear Regulatory Commission to Mr. J. S. Keenan, "Brunswick Steam Electric Plant, Unit 2 – Issuance of Amendment Regarding Revision of Safety Limit Minimum Critical Power Ratio (TAC No. MB6670)," dated March 25, 2003.

References

3. ML003680922: Letter from James F. Klapproth, General Electric Nuclear Energy to U. S. Nuclear Regulatory Commission, "Transmittal of GE Proprietary Licensing Topical report NEDE-32906P, 'TRACG Application for Anticipated Operational Occurrences (AOO) Transient Analyses,' Revision 0, dated January 2000," dated January 25, 2000.

4. ML012770430: Letter from the U. S. Nuclear Regulatory Commission to Mr. James F. Klapproth, "Safety Evaluation on General Electric Nuclear Energy Topical Report NEDE-32906P, Revision 0, 'TRACG Application for Anticipated Operational Occurrences (AOO) Transient Analyses,' (TAC No. MA7779)," dated October 22, 2001.

5. ML993230184: Letter from Mr. Stuart A. Richards, U. S. Nuclear Regulatory Commission, to Mr. Glen A. Watford, General Electric, "Amendment 26 to GE Licensing Topical Report NEDE-24011-P-A, 'GESTAR II,' – Implementing Improved GE Steady-State Methods (TAC No. MA6481)," dated November 10, 1999.

6. ML003697192: Letter from Mr. Stuart A. Richards, U. S. Nuclear Regulatory Commission, to Mr. Glen A. Watford, General Electric, "Amendment 26 to GE Nuclear Energy Licensing Topical Report NEDE-24011-P-A (GESTAR II) – Clarifying Classification BWR-6 Pressure Regulator Failure Downscale Event (NRC TAC No. MA6481), dated March 29, 2000.

Marked-up Technical Specification Pages - Unit 1

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 ≤ 23% RTP. I

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

MCPR shall be ≥ 1.12 for two recirculation loop operation or ≥ 1.11 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.

5.6 Reporting Requirements (continued)

5.6.5 CORE OPERATING LIMITS REPORT (COLR)

a. Core operating limits shall be established prior to each reload cycle, or prior to any remaining portion of a reload cycle, and shall be documented in the COLR for the following:

1. The AVERAGE PLANAR LINEAR HEAT GENERATION RATE (APLHGR) for Specification 3.2.1;

2. The MINIMUM CRITICAL POWER RATIO (MCPR) for Specification 3.2.2;

3. The period based detection algorithm (PBDA) setpoint for Function 2.f, Oscillation Power Range Monitor (OPRM) Upscale, for Specification 3.3.1.1; and

4. The Allowable Values and power range setpoints for Rod Block Monitor Upscale Functions for Specification 3.3.2.1.

b. The analytical methods used to determine the core operating limits shall be those previously reviewed and approved by the NRC, specifically those described in the following documents:

1. NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel" (latest approved version).

2. NEDE-32906P-A, "TRACG Application for Anticipated Operational Occurrences (AOO) Transient Analyses," approved version as specified in the COLR.

c. The core operating limits shall be determined such that all applicable limits (e.g., fuel thermal mechanical limits, core thermal hydraulic limits, Emergency Core Cooling Systems (ECCS) limits, nuclear limits such as SDM, transient analysis limits, and accident analysis limits) of the safety analysis are met.

d. The COLR, including any midcycle revisions or supplements, shall be provided upon issuance for each reload cycle to the NRC.

(continued)

Typed Technical Specification Pages - Unit 1

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 ≤ 23% RTP.

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

MCPR shall be ≥ 1.11 for two recirculation loop operation or ≥ 1.12 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.

5.6 Reporting Requirements (continued)

5.6.5 CORE OPERATING LIMITS REPORT (COLR)

a. Core operating limits shall be established prior to each reload cycle, or prior to any remaining portion of a reload cycle, and shall be documented in the COLR for the following:

1. The AVERAGE PLANAR LINEAR HEAT GENERATION RATE (APLHGR) for Specification 3.2.1;

2. The MINIMUM CRITICAL POWER RATIO (MCPR) for Specification 3.2.2;

3. The period based detection algorithm (PBDA) setpoint for Function 2.f, Oscillation Power Range Monitor (OPRM) Upscale, for Specification 3.3.1.1; and

4. The Allowable Values and power range setpoints for Rod Block Monitor Upscale Functions for Specification 3.3.2.1.

b. The analytical methods used to determine the core operating limits shall be those previously reviewed and approved by the NRC, specifically those described in the following documents:

1. NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel" (latest approved version).

2. NEDE-32906P-A, "TRACG Application for Anticipated Operational Occurrences (AOO) Transient Analyses," approved version as specified in the COLR.

c. The core operating limits shall be determined such that all applicable limits (e.g., fuel thermal mechanical limits, core thermal hydraulic limits, Emergency Core Cooling Systems (ECCS) limits, nuclear limits such as SDM, transient analysis limits, and accident analysis limits) of the safety analysis are met.

d. The COLR, including any midcycle revisions or supplements, shall be provided upon issuance for each reload cycle to the NRC.

(continued)

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Enclosure 7

Marked-up Technical Specification Bases Pages - Unit 1
(For Information Only)

B 3.2 POWER DISTRIBUTION LIMITS

B 3.2.2 MINIMUM CRITICAL POWER RATIO (MCPR)

BASES

BACKGROUND

MCPR is a ratio of the fuel assembly power that would result in the onset of boiling transition to the actual fuel assembly power. The MCPR Safety Limit (SL) is set such that 99.9% of the fuel rods avoid boiling transition if the limit is not violated (refer to the Bases for SL 2.1.1.2). The operating limit MCPR is established to ensure that no fuel damage results during anticipated operational occurrences (AOOs). Although fuel damage does not necessarily occur if a fuel rod actually experienced boiling transition (Ref.1), the critical power at which boiling transition is calculated to occur has been adopted as a fuel design criterion.

The onset of transition boiling is a phenomenon that is readily detected during the testing of various fuel bundle designs. Based on these experimental data, correlations have been developed to predict critical bundle power (i.e., the bundle power level at the onset of transition boiling) for a given set of plant parameters (e.g., reactor vessel pressure, flow, and subcooling). Because plant operating conditions and bundle power levels are monitored and determined relatively easily, monitoring the MCPR is a convenient way of ensuring that fuel failures due to inadequate cooling do not occur.

APPLICABLE SAFETY ANALYSES

REPLACE WITH INSERT

The analytical methods and assumptions used in evaluating the AOOs to establish the operating limit MCPR are presented in References 2, 3, 4, 5, 6, and 7. To ensure that the MCPR SL is not exceeded during any transient event that occurs with moderate frequency, limiting transients have been analyzed to determine the largest reduction in critical power ratio (CPR). The types of transients evaluated are loss of flow, increase in pressure and power, positive reactivity insertion, and coolant temperature decrease. The limiting transient yields the largest change in CPR (ΔCPR). When the largest ΔCPR is added to the MCPR SL, the required operating limit MCPR is obtained.

The MCPR operating limits derived from the transient analysis are dependent on the operating core flow and power state ($MCPR_f$ and

(continued)

INSERT FOR B 3.2.2, APPLICABLE SAFETY ANALYSES

The analytical methods and assumptions used in evaluating the AOOs to establish the operating limit MCPR are presented in References 2, 3, 4, 5, 6, 7, and 8. To ensure that 99.9% of the fuel rods avoid boiling transition during any transient that occurs with moderate frequency, limiting transients are analyzed either with TRACG or other methodologies. The types of transients evaluated are loss of flow, increase in pressure and power, positive reactivity insertion, and coolant temperature decrease. The TRACG methodology calculates an operating limit MCPR (OLMCPR) for the transient initial condition that will result in no more than 0.1% of the fuel rods susceptible to boiling transition. The other methodologies calculate a reduction in CPR for each transient, with the largest change in CPR (ΔCPR) resulting from the limiting transient. When the largest delta-CPR is added to the MCPR SL, an OLMCPR is obtained. The most limiting of the OLMCPR calculated by either the TRACG or other methodology sets the core operating limits.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.2.2.1 (continued)

slowness of changes in power distribution during normal operation. The 12 hour allowance after THERMAL POWER ≥ 23% RTP is achieved is acceptable given the large inherent margin to operating limits at low power levels.

SR 3.2.2.2

Because the transient analysis takes credit for conservatism in the scram speed performance, it must be demonstrated that the specific scram speed distribution is consistent with that used in the transient analysis. SR 3.2.2.2 determines the value of τ, which is a measure of the actual scram speed distribution compared with the assumed distribution. The MCPR operating limit is then determined based on an interpolation between the applicable limits for ~~ODYN~~ Option A (scram times of LCO 3.1.4, "Control Rod Scram Times") and ~~ODYN~~ Option B (realistic scram times) analyses. The MCPR operating limits for the ~~ODYN~~ Option A and ~~ODYN~~ Option B analyses are specified in the COLR. The parameter τ must be determined once within 72 hours after each set of scram time tests required by SR 3.1.4.1, SR 3.1.4.2, and SR 3.1.4.4 because the effective scram speed distribution may change during the cycle. The 72 hour Completion Time is acceptable due to the relatively minor changes in τ expected during the fuel cycle.

REFERENCES

1. UFSAR Section 4.4.2.1.
2. NEDO-24011-P-A, General Electric Standard Application for Reactor Fuel (latest approved version).
3. UFSAR, Chapter 4.
4. UFSAR, Chapter 6.
5. UFSAR, Chapter 15.
6. NEDC-31776P, Brunswick Steam Electric Plant Units 1 and 2 Single-Loop Operation, December 1989.

(continued)

BASES

REFERENCES (continued)

7. NEDC-31654P, Maximum Extended Operating Domain Analysis for Brunswick Steam Electric Plant, February 1989.

8. 10 CFR 50.36(c)(2)(ii).

8. NEDE-32906P-A, "TRACG Application for Anticipated Operational Occurrences (AOO) Transient Analyses," approved version as specified in the COLR.

List of Regulatory Commitments

The following table identifies those actions committed to by Progress Energy Carolinas, Inc. (PEC) 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 the Manager - Support Services at the Brunswick Steam Electric Plant.

Commitment	Schedule
None.	N/A