



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATING TO REVISION OF SAFER/GESTR-LOCA METHODOLOGY REPORT

CAROLINA POWER & LIGHT COMPANY

BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2

DOCKET NO. 50-325 AND 50-324

1.0 INTRODUCTION

By letter dated September 6, 1990 (Reference 1), as supplemented by letter dated November 21, 1990, (Reference 6) Carolina Power & Light Company (CP&L or the licensee) submitted a request to use the SAFER/GESTR loss-of-coolant accident (LOCA) methodology for analysis of postulated LOCA for the Brunswick Steam Electric Plant (BSEP), Units 1 and 2. This request was supported by the General Electric (GE) Nuclear Energy Report, NEDC-31624P, Revision 2 (Reference 2). The original version (Revision 0) of this report (Reference 3) was submitted in a letter dated March 29, 1989, (Reference 4) and was approved by the Nuclear Regulatory Commission (NRC) by letter dated June 1, 1989 (Reference 5). Following approval of Revision 0 of the SAFER/GESTR-LOCA methodology, a revision of the report (Revision 1) was prepared by GE. However, publication errors were found in Revision 1, so corrections were made and the report was issued as Revision 2. CP&L has stated that the results and conclusions of the original (Revision 0) report remain unchanged and no changes are required to the Technical Specifications or to the thermal limits in the Core Operating Limits Report.

2.0 EVALUATION

CP&L submitted NEDC-31624P, Revision 2, with changes from the approved Revision 0 marked with vertical bars. CP&L stated that the primary purpose of the revision was to correct the reported value of an input parameter. The value incorrectly reported was the analytical limit of the low water level 3 setpoint used in the analyses. It was stated that the correction did not affect the results and conclusions of the original evaluation. In addition, a revision was made to include the high pressure coolant injection (HPCI) system in the list of equipment that remains available for the DC Power (j) case. This revision was said to not affect the results and conclusions of the original evaluation since no credit was taken for the HPCI in the analyses. The remaining changes were administrative in nature and included (1) updating references to recent evaluations performed to support alternate operating modes, (2) identifying water level setpoints, and (3) the magnitude of the changes in the water level setpoint analytical limits between the original and revised licensing bases.

The staff reviewed the changes and found, based on the results of the licensee's analysis, that the change for the analytical limit of the low water level 3 setpoint used in the analysis did not impact the conclusions of the original evaluation.

The staff questioned the licensee about the changes made in Section 5.3.1, single loop operation, between Revision 0 and Revision 2, in which some information was removed and a reference changed. Section 5.3.1 of both the original report (Revision 0) and the revised report (Revision 2) address the applicability of the rated maximum average planar linear heat generation rate (MAPLHGR) thermal limit to fuel types present in the core under single loop operating conditions. The licensee provided information in a November 11, 1990, letter (Reference 6) to explain the changes for Section 5.3.1 in Revision 2. The licensee stated that large peak clad temperature (PCT) margins are obtained using SAFER/GESTR-LOCA methodology for single loop conditions, even when rated MAPLHGR values are considered. At the time the Revision 0 report was published, the applicable single loop operation analysis was one performed in 1981 using the SAFE/REFLOOD methodology. The SAFE/REFLOOD methodology is based on original 10 CFR Part 50, Appendix K, requirements. When applied to single loop conditions, these conservative methods required a MAPLHGR penalty which could be applied as a multiplier on the MAPLHGR thermal limit. The discussion in Section 5.3.1 of the Revision 0 report confirmed the applicability of the results of the 1981 single loop report with the new LOCA licensing basis. Subsequent to publication of the Revision 0 report, an updated single loop operations analysis was completed in 1990 as reported in Reference 4 of Revision 2. Among other things, this analysis specifically addressed the thermal limit requirements applicable to single loop operations in the event of a LOCA using the SAFER/GESTR-LOCA methodology which had been accepted by the NRC for referencing as the revised LOCA licensing basis for the Brunswick Plant.

When the licensee recognized the Revision 0 report would need to be revised, they decided to include a revision to Section 5.3.1 to delete reference to the 1981 single loop report and instead to reference the 1990 report. As described above and in Section 5.3.1 of Revision 0, sufficient PCT margin exists when evaluated using the SAFER/GESTR-LOCA methodology, including when rated MAPLHGR values are considered during single loop operating conditions. The revised Section 5.3.1 of Revision 2 states that the rated MAPLHGR values for the listed fuel types are supported by the results of the 1990 report. The licensee stated that application of the results of the 1990 single loop report will not occur without changes to the Technical Specifications for Brunswick and do not change the results or conclusions of Revision 0 report.

There were other changes in Revision 2 that were for accuracy or did not impact results as they were administrative.

Based on the above evaluation, the staff has found all the changes to be acceptable.

### 3.0 DESCRIPTION OF CHANGES MADE IN NEDC-31624P, REVISION 2

#### Page 3-2

The HPCI system was identified as one of the available systems that would remain available in the event of the DC Power (j) single failure event.

Page 4-2

The analytical limit used for reactor low water level 3 for the current SAFER/GESTR LOCA analyses was the same as that used for the previous licensing bases. Thus, the change in this value that was originally reported in the original revision (Reference 3) was deleted.

Pages 4-4, 4-5 and 4-6

The analytical limit for reactor low water level 3 was correctly reported as 369.5 inches to reflect the value of this input parameter used in the SAFER/GESTR LOCA analyses.

Page 4-7

Additional clarification was provided to indicate that the initiating reactor water low level signal for the HPCI system is the low water level 2 signal.

Page 4-8

The HPCI system was identified as one of the available systems that would remain available in the event of the DC Power (j) single failure event.

Page 5-6

The discussions of the single loop and load line limit alternate operating modes were updated to reflect recent evaluations. Technical Specifications were not altered and do not currently permit extended periods of operation with only a single recirculation loop operable. The load line limit discussion was expanded to reflect the evaluation of the Brunswick units for operation in the maximum extended operating domain (MEOD). The changes to the Technical Specifications for Unit 2 have been approved for the current fuel cycle. Unit 1 will implement MEOD at the beginning of Cycle 8.

Page 7-1

The publication date of Reference 3 was provided and Reference 4 was changed to reference the most recent single loop operation evaluation report.

Page 7-2

Reference 13 was added to include a reference to the MEOD evaluation performed for both Brunswick units.

The staff found the above changes to be acceptable as discussed in Section 2.0.

4.0 CONCLUSION

The modifications made for Revision 2 of NEDC-31624P from the approved Revision 0 version were evaluated. The changes were found to be acceptable as described above and did not impact the conclusions of the original approved version.

Dated: January 10, 1991

Principal Contributor: H. Balukjian

5.0 REFERENCES

1. Letter from L. I. Loflin, Carolina Power & Light Company, to USNRC, regarding SAFER/GESTR LOCA Analysis Revision, dated September 6, 1990.
2. NEDC-31624P, Revision 2, "Brunswick Steam Electric Plant Units 1 and 2 SAFER/GESTR LOCA Loss-of-Coolant Accident Analysis (Revision 2)," K. F. Cornell and C. R. Wade, July 1990.
3. NEDC-31624P, "Brunswick Steam Electric Plant Units 1 and 2 SAFER/GESTR LOCA Loss-of-Coolant Accident Analysis," K. F. Cornell and C. R. Wade, September 1988.
4. Letter from A. B. Cutter, Carolina Power & Light Company, to NRC Document Control Desk, "SAFER/GESTR LOCA Loss-of-Coolant Analysis," March 29, 1989.
5. Letter from E. G. Tourigny, NRC, to L. W. Eury, Carolina Power & Light, "SAFER/GESTR LOCA Analysis, Brunswick Steam Electric Plant, Units 1 and 2 (TAC Nos. 72854/72855)," June 1, 1989.
6. Letter from Leonard I. Loflin, Carolina Power & Light, to USNRC, regarding SAFER/GESTR LOCA Analysis Revision, dated November 21, 1990.