CP&L
A Progress Energy Company

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APR 26 2002

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TSC-2001-09

U. S. Nuclear Regulatory Commission
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BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2
DOCKET NOS. 50-325 AND 50-324/LICENSE NOS. DPR-71 AND DPR-62
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION REGARDING
REQUEST FOR LICENSE AMENDMENTS - EXTENDED POWER UPRATE
(NRC TAC NOS. MB2700 AND MB2701)

Ladies and Gentlemen:

On August 9, 2001 (i.e., Serial: BSEP 01-0086), Carolina Power & Light (CP&L) Company requested a revision to the Operating Licenses (OLs) and the Technical Specifications for the Brunswick Steam Electric Plant (BSEP), Units 1 and 2. The proposed license amendments increase the maximum power level authorized by Section 2.C.(1) of OLs DPR-71 and DPR-62 from 2558 megawatts thermal (MWt) to 2923 MWt. Subsequently, on April 23, 2002, during a meeting with the Advisory Committee On Reactor Safeguards Thermal-Hydraulic Phenomena Subcommittee, CP&L was requested to provide additional information regarding the evaluation of the limiting 10 CFR 50, Appendix R event performed in support of the extended power uprate amendment request. The response to this request for additional information is enclosed.

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

Sincerely,

EJ Gannon
for J.S. Keenan

John S. Keenan

MAT/mat

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Enclosure:

Response to Request for Additional Information (RAI) 26

C. J. Gannon, 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: 8/29/04

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ENCLOSURE

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Response to Request for Additional Information (RAI) 26

Background

On August 9, 2001 (i.e., Serial: BSEP 01-0086), Carolina Power & Light (CP&L) Company requested a revision to the Operating Licenses (OLs) and the Technical Specifications for the Brunswick Steam Electric Plant (BSEP), Units 1 and 2. The proposed license amendments increase the maximum power level authorized by Section 2.C.(1) of OLs DPR-71 and DPR-62 from 2558 megawatts thermal (MWt) to 2923 MWt. Subsequently, on April 23, 2002, during a meeting with the Advisory Committee On Reactor Safeguards Thermal-Hydraulic Phenomena Subcommittee, CP&L was requested to provide additional information regarding the evaluation of the limiting 10 CFR 50, Appendix R event performed in support of the extended power uprate amendment request. The response to this RAI follows.

NRC Question 26-1

Table 6-5, "Appendix R Fire Event Evaluation Results," of NEDC-33039P, "Safety Analysis Report for Brunswick Steam Electric Plant Units 1 and 2 Extended Power Uprate," dated August 2001 (i.e., the Power Uprate Safety Analysis Report (PUSAR)) shows that the peak cladding temperature (PCT) for this event increases from < 1200°F to 1468°F under extended power uprate (EPU) conditions. Please explain the large increase in PCT for this event.

Response to NRC Question 26-1

The Appendix R event in question involves a shutdown from outside of the main control room. The fuel heatup analysis was performed using the SAFER/GESTR-LOCA analysis model. To minimize the scope of required reviews, the preferred EPU approach was to maintain the existing cases, methods, and assumed operator action times when evaluating Appendix R events, provided the acceptance criteria were met. For this event, the acceptance criterion of a PCT < 1500°F was met using the pre-EPU assumptions. The inputs and assumptions for this event include:

- A fire occurs in the main control room at time zero.
- The fire results in a reactor scram and loss-of-offsite power (LOOP) at time zero.

- There is a concurrent loss of feedwater at time zero, with a five second pump coast-down, due to the LOOP.
- There is a LOOP and a failure of the emergency diesel generators (EDG) to auto-start on the opposite unit.
- The Reactor Core Isolation Cooling (RCIC) system is not credited for vessel inventory makeup (i.e., this assumption is a conservatism beyond what is required to meet Appendix R requirements).

For a shutdown from outside of the main control room, operators are dispatched to local control provisions in the Diesel Generator Building and the Reactor Building. With no high pressure injection available, core cooling is accomplished by vessel depressurization followed by low pressure injection. However, the depressurization cannot be started until an EDG is running to provide power to the low pressure system. At 40 minutes into the event, an EDG will have been started as needed to allow the operators in the Reactor Building to open the three Safety/Relief Valves (SRVs) with local controls.

The increased PCT for the Appendix R event is caused by the increased decay heat associated with EPU. The increased decay heat for EPU results in a lower predicted reactor water level at the assumed 40 minute operator action time. This results in a deeper core uncovery following depressurization and a higher fuel heatup. There is more steam generation due to the increased decay heat for EPU, which results in a longer period of vessel depressurization before the low pressure makeup system can inject. This delay in makeup injection also results in a higher fuel heatup for EPU. The increase in PCT shown for the BSEP EPU Appendix R event is consistent with the Appendix R results for other BWR/4 EPU projects.

Nominal input and modeling assumptions can be used in analyzing the Appendix R fire event. However, for ease of performing the analysis, the conservative system modeling assumptions from the SAFER ECCS-LOCA performance analysis were used in the Appendix R event analysis. The system modeling conservatisms include (1) no high pressure makeup, (2) ECCS performance characteristics (i.e., minimum flow rates as functions of vessel pressure, maximum valve stroke times, etc.), and (3) the use of SRVs at the rated steam flow capacity (i.e., 90% of the tested capacity). Because of the extremely low likelihood of the event combined with the conservatisms of the evaluation, CP&L determined that the reduced margin to the acceptance limit is acceptable.