



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 61 TO FACILITY OPERATING LICENSE NO. DPR-23

CAROLINA POWER AND LIGHT COMPANY

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

DOCKET NO. 50-261

INTRODUCTION

By letter to S. A. Varga dated November 11, 1981, the Carolina Power and Light Company (the licensee) has requested a license amendment for reduced primary coolant temperature operation for the H. B. Robinson Steam Electric Plant Unit 2 (HBR). The average primary system temperature will be reduced by about 38°F. The steam generator secondary temperature reduction of 36°F will be a pressure reduction from 800 psig to 580 psig. At these conditions, turbine capacity allows for a 76% of rated power output. This program of reduced temperature and power is being proposed to improve the operating conditions on the secondary side of the steam generators.

EVALUATION

The licensee has reviewed the loss-of-coolant accident (LOCA) and certain operational transients to assure adequate safety margins under the proposed conditions. The LOCA was reviewed to assure that the Emergency Core Cooling System (ECCS) design limits of 10 CFR 50.46 would not be exceeded. The principal negative effect of reduced pressure is to reduce LOCA energy release to the containment, and consequently the containment back pressure used in the ECCS large break reflood analysis. Based on several calculations, the licensee conservatively estimated the temperature effect to result in a peak cladding temperature increase of 200°F. However, this is more than offset by the reduced power (85%) effect which would reduce peak cladding temperature by at least 300°F. We agree with this assessment that the LOCA is less severe at the proposed conditions of reduced temperature and power.

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The thermal hydraulic calculations for the steady-state conditions at the reduced power and coolant temperature have shown about 50 percent increase in MDNBR as compared to the rated full load operating conditions. Based on this substantial increase in thermal margin, the licensee concludes that the anticipated operational transients will satisfy the Specified Acceptable Fuel Design Limits (SAFDL) since the changes in MDNBR during these transients will not be greater than those previously evaluated for rated full power.

The licensee reviewed the most limiting transients in each affected category considering the lower power and temperature set points. The pump coast down and loss-of-flow transients are less severe because of the increased thermal margin. The licensee has stated that events leading to turbine trip are not and do not become limiting. The new steamline break set points would not be conservative at 100% power, but at the reduced temperature/power conditions the same margin is retained. We find this acceptable for operation during the balance of the current cycle.

None of the assessments were based on rigorous plant specific analyses at the proposed conditions. However, substantial conservatisms were assumed including worst case peaking factors which could not exist this late in the cycle. While the increased thermal margin for the proposed reduced temperature operation will assure no reduction in safety margin for the limiting loss of flow transient, the same argument is not acceptable for the continuous rod withdrawal transient. An increase in moderator reactivity at reduced temperature makes the results of the latter transient unpredictable without detailed analyses. In response to the staff concern, the licensee performed additional analyses which indicate that the local peaking augmentation caused by an inadvertent control rod withdrawal under the reduced temperature conditions is about 3 percent. This result is applicable to the remainder of the current Cycle 8 where the moderator temperature coefficient is between -10 and -32 pcm/°F, well below the Technical Specification of 2 pcm/°F. Based on this result and the substantial thermal margin and reduced high power trip setpoint, the staff concludes that the proposed reduced temperature operation is acceptable for the remainder of current Cycle 8.

If this mode of operation is to continue past the current fuel cycle more rigorous calculations should be performed for the affected accidents, transients, and anticipated operational occurrences.

#### TECHNICAL SPECIFICATIONS

The new operating conditions involve changing the technical specification trip set points for high flux, over temperature  $\Delta T$ , overpower  $\Delta T$ , and coincident low Tavg or low steamline pressure with high steamline flow. The maximum power at reduced temperature will be taken to be 85% of rated capacity. We have reviewed the proposed modifications to technical specification and find them acceptable.

### Environmental Consideration

We have determined that the amendment does not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendment involves an action which is insignificant from the standpoint of environmental impact and, pursuant to 10 CFR §51.5(d)(4), that an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of this amendment.

### Conclusion

We have concluded, based on the considerations discussed above, that: (1) because the amendment does not involve a significant increase in the probability or consequences of accidents previously considered and does not involve a significant decrease in a safety margin, the amendment does not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Date: November 13, 1981