Docket

April 29, 1992

Docket No. 50-261

Mr. R. A. Watson
Senior Vice President
Nuclear Generation
Carolina Power & Light Company
Post Office Box 1551
Raleigh, North Carolina 27602

Dear Mr. Watson:

SUBJECT: ISSUANCE OF AMENDMENT NO. 140 TO FACILITY OPERATING LICENSE NO. DPR-23 REGARDING REQUIRED REFUELING SHUTDOWN MARGIN - H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2 (TAC NO. M82025)

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 140 to Facility Operating License No. DPR-23 for the H. B. Robinson Steam Electric Plant, Unit No. 2. This amendment to the Technical Specifications is in response to your request dated October 31, 1991.

The amendment changes the required refueling shutdown margin accomplished with a required minimum boron concentration of 1950 ppm from 10 percent delta k/k to 6 percent delta k/k.

A copy of the related Safety Evaluation is enclosed. Notice of Issuance will be included in the Commission's bi-weekly Federal Register notice.

Sincerely,

Original signed by

Ronnie H. Lo, Senior Project Manager
Project Directorate II-I
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosures:
1. Amendment No. 140 to DPR-23
2. Safety Evaluation

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cc w/enclosures:
See next page

DRPE:PD21	DRPE:PD21	OGC	DRPE		
PAnderson	RLo	CPW	EAdensam		
4/13/92	4/13/92	4/16/92	4/29/92	/ /	/ /

DFO1

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

CAROLINA POWER & LIGHT COMPANY

DOCKET NO. 50-261

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

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 140
License No. DPR-23

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Carolina Power & Light Company (the licensee), dated October 31, 1991, 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 3.B. of Facility Operating License No. DPR-23 is hereby amended to read as follows:

   B. Technical Specifications

   The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 140 , are hereby incorporated in the license. Carolina Power & Light Company shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Elinor G. Adensam, Director
Project Directorate II-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: April 29, 1992

ATTACHMENT TO LICENSE AMENDMENT NO. 140

FACILITY OPERATING LICENSE NO. DPR-23

DOCKET NO. 50-261

Replace the following pages of the Appendix A Technical Specifications with the enclosed pages. The revised areas are indicated by marginal lines.

Remove Pages	Insert Pages
3.6-1	3.6-1
3.6-3	3.6-3
3.6-4	3.6-4
3.8-4	3.8-4
3.8-4a	3.8-4a
3.8-6	3.8-6
3.10-10	3.10-10

3.6 CONTAINMENT SYSTEM

Applicability

Applies to the integrity of reactor containment.

Objective

To define the operating status of the reactor containment for plant operation.

Specification

3.6.1 Containment Integrity

a. The containment integrity (as defined in 1.7) shall not be violated unless the reactor is in the cold shutdown condition.

b. The containment integrity shall not be violated when the reactor vessel head is removed unless a shutdown margin of at least 6% $\Delta k/k$ is constantly maintained.

c. Positive reactivity changes shall not be made by rod drive motion when the containment integrity is not intact except during any one of the following evolutions:

1. rod drop timing test

2. rod drive mechanism timing test

3. control rod exercise test

4. shutdown banks fully withdrawn and control banks withdrawn to $\leq$ 5 steps.

3.6.4 Containment Purge and Vent Valves

3.6.4.1 During periods when Containment integrity is required, the Containment Purge Supply and Exhaust Isolation Valves (42") or the Pressure and Vacuum Relief Valves (6") may be opened only for safety related reasons including operational testing and surveillances.

3.6.4.2 When the RCS is greater than 200°F, the 42" and 6" valves may not be open simultaneously.

3.6.4.3 The 6" and 42" valves will be tested in accordance with the frequency and operability requirements specified in the Robinson plant IST program except that the 42" valves will be tested prior to use if not tested within the previous quarter. Otherwise the 42" valves will not be cycled quarterly only for testing purposes.

Basis

The Reactor Coolant System conditions of cold shutdown assure that no steam will be found and hence there would be no pressure buildup in the containment if the Reactor Coolant System ruptures.

The shutdown margins are selected based on the type of activities that are being carried out. The 6% Δk/k shutdown margin during refueling precludes criticality, even though fuel is being moved and provides sufficient time for the reactor operator to recognize an inadvertent boron dilution event and take corrective actions to mitigate the effects[3]. When the reactor head is not to be removed, the specified cold shutdown margin of 1% Δk/k precludes criticality.

Regarding internal pressure limitations, the containment design pressure of 42 psig would not be exceeded if the internal pressure before a major loss-of-coolant accident were as much as 2 psig.[1] The containment is designed to withstand an internal vacuum of 2.0 psig.[2]

The Containment Purge Supply and Exhaust Isolation Valves may be opened during plant operation when needed for safety related considerations (equipment or personnel) to support plant operations and maintenance activities within the containment vessel. Examples of this need may include the reducing of airborne activity to increase stay-time or eliminate the need for respiratory protective equipment, or reduce ambient temperature during hot months to increase effectiveness of workers and to minimize occupational effects of necessary, non-routine activities in the containment. Although the valves are fully qualified to close under design basis accident conditions, it is intended that the time the valves remain open will be limited.

The Containment Purge Valves must be operable and must close within the time limit specified in the IST program in order to limit post LOCA thyroid dose and to limit the increase in peak clad temperature due to reduction in containment internal pressure.

The Inboard Purge Supply and Exhaust Isolation Valves are installed so the seal replacement can be performed without removing the valves. This orientation requires that the inboard valves be restricted from exceeding 70° open. This restriction is an anti-rotation measure to assure proper valve closure under dynamic conditions, as well as to limit offsite dose consequences under postulated LOCA conditions.

References

(1) FSAR Section 6.2.1
(2) FSAR Section 3.8.1.3
(3) UFSAR Section 15.4.6

Basis

The equipment and general procedures to be utilized during refueling are discussed in the Final Facility Description and Safety Analysis Report. Detailed instructions, the above specified precautions, and the design of the fuel handling equipment incorporating built-in interlocks and safety features, provide assurance that no incident could occur during the refueling operations that would result in a hazard to public health and safety.[1] Whenever changes are not being made in core geometry one flux monitor is sufficient. This permits maintenance of the instrumentation. Continuous monitoring of radiation levels and neutron flux provides immediate indication of an unsafe condition.

One residual heat removal loop will normally be in operation during refueling operations to remove decay heat, maintain Tave $\leq$ 140°F, minimize the effect of a boron dilution event, and maintain a uniform boron concentration. The requirement to have one loop operable will allow the loop to be secured for brief periods of time to facilitate fuel movement. The refueling cavity water level specified ensures that there will be at least 23 feet of water above the reactor pressure vessel flange whenever fuel assemblies are being moved within the reactor pressure vessel. This prevents a fuel assembly from becoming partially uncovered while being transported over the vessel flange. This cavity level requirement also provides a large heat sink to ensure adequate time is available to initiate emergency methods to cool the core should the operable RHR loop fail.

The boron concentration of 1950 ppm is more than enough to keep the core subcritical even if all control rods were withdrawn from the core (as required by the Post-LOCA subcriticality event analysis)[2]. During refueling, the reactor refueling cavity is filled with approximately

285,000 gallons of borated water. The boron concentration of this water at 1950 ppm boron is sufficient to maintain the reactor subcritical by at least 6% $\Delta k/k$ in the refueling condition with all rods inserted. Weekly checks of refueling water storage tank boron concentration ensure the proper shutdown margin.[3] Direct communications allow the control room operator to inform the manipulator operator of any impending unsafe condition detected from the control board indicators during fuel movement.

In addition to the above safety features, interlocks are utilized during refueling to ensure safe handling. An excess weight interlock is provided on the lifting hoist to prevent movement of more than one fuel assembly at a time. The spent fuel transfer mechanism can accommodate only one fuel assembly at a time.

The relative humidity (R.H.) of the air processed by the refueling filter systems should be less than the R.H. used during the testing of the charcoal adsorbers in order to assure that the adsorbers will perform under accident conditions as predicted by the test results. Heaters have been installed upstream of the Spent Fuel Building filters to assure of an R.H. of less than 70 percent for the air processed by the Spent Fuel Building filter system. If an R.H. in the containment atmosphere exceeds 70 percent, operation of the containment purge system will be terminated until this specification can be met. If the Spent Fuel Building filter system is found to be inoperable, all fuel handling and fuel movement operations in the Spent Fuel Building will be terminated until the system is made operable.

The temperature limit specified for the fuel cask handling crane is based on the recorded ambient temperature at the time of the 125% load test. The limit is imposed to assure adequate toughness properties of the crane structural materials.

References

(1) FSAR Section 9.4.1
(2) Westinghouse letter CPL-86-552 (dated 8-21-86) and Westinghouse Technical Bulletin NSID-TB-86-08 (dated 10-31-86) "Post-LOCA Long-Term Cooling: Boron Requirements."
(3) FSAR Section 9.4.1
(4) H. B. Robinson Unit 2 Radiological Assessment of Postulated Accidents, XN-NF-84-68(P), July 1984.

3.10.8.2 When the reactor is in the cold shutdown condition, the shutdown margin shall be at least 1 percent $\Delta k/k$.

3.10.8.3 When the reactor is in the refueling operation mode, the shutdown margin shall be at least 6 percent $\Delta k/k$.

Basis

The reactivity control concept is that reactivity changes accompanying changes in reactor power are compensated by control rod motion. Reactivity changes associated with xenon, samarium, fuel depletion, and large changes in reactor coolant temperature (operating temperature to cold shutdown) are compensated by changes in the soluble boron concentration. During power operation, the shutdown groups are fully withdrawn and control of reactor power is by the control groups. A reactor trip occurring during power operation will put the reactor into the hot shutdown condition.

The control rod insertion limits provide for achieving hot shutdown by reactor trip at any time assuming the highest worth control rod remains fully withdrawn with sufficient margins to meet the assumptions used in the accident analysis. In addition, they provide a limit on the maximum inserted rod worth in the unlikely event of hypothetical rod ejection and provide for acceptable nuclear peaking factors. The solid lines shown in Figure 3.10-1 meet the shutdown requirement for the first 50 percent of the cycle. The end-of-cycle life limit is represented by the dotted lines. The end-of-cycle life limit may be determined on the basis of plant startup and operating data to provide a more realistic limit which will allow for more flexibility in plant operation and still assure compliance with the shutdown requirement. The maximum shutdown margin requirement occurs at end of core life and is based on the value used in analysis of the hypothetical steam break accident. Early in core life, less shutdown margin is required, and Figure 3.10-2 shows the shutdown margin required at end of life with respect to an uncontrolled cooldown. All other accident analyses are based on 1 percent reactivity

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 140 TO FACILITY OPERATING

LICENSE NO. DPR-23

CAROLINA POWER & LIGHT COMPANY

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

DOCKET NO. 50-261

1.0 INTRODUCTION

By letter dated October 31, 1991, the Carolina Power & Light Company (licensee) submitted a request for changes to the H. B. Robinson Steam Electric Plant, Unit No. 2 (HBR2), Technical Specifications (TS). The proposed change is a reduction in the current TS requirement for shutdown margin (SDM), during the refueling mode, from 10 to 6 percent delta k/k. The current TS requirement for the minimum boron concentration in the water of the primary and connected systems during refueling would remain unchanged at 1950 ppm boron.

2. EVALUATION

The HBR2 has two TS requirements relating to reactivity limitations during refueling operations. These are TS 3.8.1.f (refueling) which requires 1950 ppm boron in the water during refueling and TSs 3.6.1.b (Containment Integrity) and 3.10.8.3 (required SDMs) which currently require the refueling SDM to be at least 10% delta k/k. For past operating cycles, the two specifications have been compatible with 1950 ppm boron providing more than 10% delta k/k. However, increase in cycle length and fuel enrichment have resulted in HBR2 not being able to achieve 10% delta k/k SDM with 1950 ppm during the next cycle.

Of the various possible solutions to this problem, e.g., higher refueling water storage tank boron concentration, more burnable poison, limiting cycle length, or a change to the SDM requirement, CP&L has proposed to adopt an SDM change as being the most straightforward and causing the least change to core design, other systems or operations. While some of the older Westinghouse reactors have had a 10 percent SDM, most of them, the current Westinghouse Standard Technical Specifications (STS), and the proposed new STS have a 5 percent SDM requirement. Thus, the proposed 6 percent SDM for HBR2 would remain conservative compared to currently acceptable requirements.

The 6% delta k/k SDM and the retention of the 1950 ppm boron requirement (in TS 3.8.1.f) have been determined to be sufficient (1) to assure subcriticality with all control rods withdrawn (they are normally fully inserted for refueling operations with at most one rod at a time withdrawn), (2) to provide sufficient shutdown to meet the requirements of the boron dilution during shutdown operations event analysis (time available for operator action is 41 minutes compared to a required 30) and (3) to cover any reactivity uncertainty during fuel movement in the fuel shuffle procedures. The subcritical reactor status with all rods withdrawn with 1950 ppm boron will remain in the basis for TS 3.8, with a note added to indicate its connection to post-LOCA boron requirements.

The necessary requirements for shutdown reactivity status are retained by this change in SDM. Among the various solutions, this change provides the least disruption to operations of the reactor. The required SDM remains conservative relative to that required for other similar reactors. Therefore, we conclude that the proposed change is acceptable.

3.0 SUMMARY

We have reviewed the reports submitted by CP&L for HBR2 proposing TS changes relating to the change of the refueling mode SDM from 10 to 6 percent delta k/k. Based on this review, we have concluded that appropriate documentation was submitted and the proposed TS changes satisfy staff positions and requirements in these areas. Operation in the mode proposed for HBR2 is acceptable.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the State of South Carolina official was notified of the proposed issuance of the amendment. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes 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 amendment involves 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 amendment involves no significant hazards consideration, and there has been no

public comment on such finding (56 FR 66917). Accordingly, the amendment meets 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 amendment.

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) 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.

Principal Contributor: H. Richings

Date: April 29, 1992

AMENDMENT NO. 140 TO FACILITY OPERATING LICENSE NO. DPR-23 - ROBINSON, UNIT NO. 2

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