Docket No. 50-261

OCT 26 1972

Carolina Power & Light Company
ATTN Mr. E. E. Utley, Manager
Generation and System Operation
336 Fayetteville Street
Raleigh, North Carolina 27602

Change No. 10
License No. DPR-23

Gentlemen

By letter dated May 8 1972, you proposed a change to the Technical Specifications appended to Operating License No. DPR-23, as amended. The proposed change would permit movement of the part-length control rods in H. B. Robinson Unit No. 2 in two independent banks of four rods each rather than restricting movement to one bank of eight rods

During our review of your proposed change, we informed your staff that certain modifications to your proposal were necessary to meet our regulatory requirements. These modifications have been made. We conclude that Change No. 10 does not present significant hazards considerations not described or implicit in the Safety Analysis Report and that there is reasonable assurance that the health and safety of the public will not be endangered.

Pursuant to 10 CFR Part 50, Section 50.59, the Technical Specifications appended to Provisional Operating License No. DPR-5 are changed as indicated by margin bars in Attachment A.

Sincerely,

Donald J. Skovholt
Assistant Director for
Operating Reactors
Directorate of Licensing

Enclosure
Attachment A

cc See next page

OCT 26 1972

cc w/enclosure:
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DATE ▸	10/25/72	10/25/72	10/26/72	10/26/72		

Form AEC-318 (Rev. 9-53) AECM 0240

ATTACHMENT A

CHANGE NO. 10

OPERATING LICENSE NO. DPR-23

CAROLINA POWER & LIGHT COMPANY

DOCKET NO. 50-261

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Change No. OCT 26 1972
Date:

3.10 CONTROL ROD AND POWER DISTRIBUTION LIMITS

Applicability:

Applies to the operation of the control rods and power distribution limits.

Objective:

To ensure (1) core subcriticality after a reactor trip, (2) limited potential reactivity insertions from a hypothetical control rod ejection, and (3) an acceptable core power distribution during power operation.

Specification:

3.10.1 Full Length Control Rod Insertion Limits

3.10.1.1 When the reactor is subcritical prior to startup, the shutdown margin shall be at least that shown in Figure 3.10-2.

3.10.1.2 When the reactor is critical, except for physics tests and full length control rod exercises, the shutdown control rods shall be fully withdrawn.

3.10.1.3 When the reactor is critical, except for physics tests and full length control rod exercises, the control group rods shall be no further inserted than the limits shown by the solid lines on Figure 3.10-1 for 3 loop or 2 loop operation.

3.10.1.4 After 70% of the second and subsequent cycles as defined by burnup, the limits shall be adjusted as a linear function of burnup toward the end-of-core life values as shown by the dotted lines on Figure 3.10-1.

3.10.1.5 During physics tests and full length control rod exercises, the insertion limits need not be observed, but the Figure 3.10-2 must be observed.

3.10.2 <u>Power Distribution Limits</u>

3.10.2.1 If the quadrant to average power tilt ratio exceeds 1.1 except for physics tests, or:

If a part length or full length control rod is more than 15 inches out of alignment with its bank, then within eight hours:

a. The situation shall be corrected, or

b. The hot channel factors shall be determined and maximum allowable power shall be reduced one percent for each percent the hot channel factor exceeds the design values of

$$F_q^N = 3.13: F^N_{\Delta H} = 1.75, \text{ or}$$

c. Power shall be limited to 75% of rated power for 3 loop operation or 45% of rated power for 2 loop operation.

3.10.2.2 If after a period of 24 hours, the power tilt ratio in 3.10.2.1 is not corrected to less than 1.1:

a. An evaluation of the cause of the discrepancy shall be made and reported to the Atomic Energy Commission, and

b. The nuclear overpower, overpower ΔT and overtemperature ΔT trips shall be reduced one percent for each percent the operating power level has been reduced.

3.10.2.3 If the quadrant to average power tilt ratio exceeds 1.25, the reactor shall be put in the hot shutdown condition utilizing normal operating procedures and the Atomic Energy Commission notified.

3.10.3 Rod Drop Time

3.10.3.1 The drop time of each full length control rod shall be no greater than 1.8 seconds at full flow and operating temperature from the beginning of rod motion to dashpot entry.

3.10.4 Part Length Control Rod Banks

3.10.4.1 The eight (8) part length control rods shall be configured under administrative control into one of the following part length rod configurations.

a. Four part length rods occupying core positions K-6, K-10, F-6, and F-10 shall constitute a part length control rod bank, hereafter designated Bank P-1.

b. Four part length rods occupying core positions P-8, H-2, H-14, and B-8 shall constitute a part length rod bank, hereafter designated Bank P-2.

c. Combined Banks P-1 and P-2, hereafter designated Bank P-3.

3.10.4.2 The part length rod banks may be moved over the entire range, full out to full in, without restrictions provided that at any time only one part length rod bank is in the core.

3.10.5 Inoperable Full Length and Part Length Control Rods

3.10.5.1 A full length or part length control rod shall be deemed inoperable if (a) the rod is misaligned by more than 15 inches with its bank; (b) if the rod cannot be moved by its drive mechanism or (c) if its rod drop time is not met in the case of a full length rod.

3.10.5.2 No more than one inoperable control rod shall be permitted during power operation.

3.10.5.3 If a full length control rod cannot be moved by its mechanism, boron concentration shall be changed to compensate for the withdrawn worth of the inoperable rod such that shutdown margin equal to or greater than shown on Figure ~~3.10-3~~ 3.10-2 results.

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.(1) In addition, they provide a limit on the maximum inserted rod worth in the unlikely event of a hypothetical rod ejection, and provide for acceptable nuclear peaking factors. The solid lines shown on Figure 3.10-1 meet the shutdown requirement for the first cycle and the first 70% of second and subsequent cycles. The end-of-core-life limit may be more restrictive, as shown by the conservative estimate represented by the dotted lines. The end-of-core-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 equivalent to 1.77% reactivity at end-of-life with respect to an uncontrolled cooldown. All other accident analyses are based on 1% reactivity shutdown margin.

Positioning of the part-length rods is governed by the requirement to maintain the axial power shape within specified limits or to accept an automatic cutback of the overpower delta T set points (see Specification 2.3). Thus, there is no need for imposing a limit on the physical positioning of a part-length rod bank.

The various control rod banks (shutdown banks, control banks, and part-length rods) are each to be moved as a bank, that is, with all rods in the band within one step (5/8 inch) of the bank position. Position indication is provided by two methods: a digital count of actuation pulses which shows the demand position of the banks and a linear position indicator (LVDT) which indicates the actual rod position.[2] The 15-inch permissible misalignment provides an enforceable limit below which design distribution is not exceeded. In the event that an LVDT is not in service, the effects of a malpositioned control rod are observable on nuclear and process