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November 13, 1981

Docket No. 50-261

Mr. J. A. Jones
Senior Executive Vice President
Carolina Power and Light Company
336 Fayetteville Street
Raleigh, North Carolina 27602

Dear Mr. Jones:

The Commission has issued the enclosed Amendment No. 61 to Facility Operating License No. DPR-23 for the H. B. Robinson Steam Electric Plant, Unit No. 2. The amendment consists of changes to the Operating License and the Technical Specifications in response to your application transmitted by letter dated November 11, 1981.

The amendment revises the Technical Specifications to provide for reduced primary coolant temperature operation for the remainder of the current fuel cycle. In addition, the Operating License condition 3.I.a is revised.

Please note that this license amendment and attached Safety Evaluation for reduced primary coolant temperature operation of H. B. Robinson only covers operation until the end of the current fuel cycle. If after refueling, which we understand is expected to occur in March 1982, you wish to continue H. B. Robinson operation in accordance with these revised Technical Specifications we will require that you submit for our review and approval your detailed transients and accident analysis (Section 14 of the Robinson FSAR) for the reduced primary temperature operation at least 6 weeks prior to startup after reload.

Copies of the Safety Evaluation and the Notice of Issuance are also enclosed.

Sincerely,
Original Signed By:
M. Grotenhuis
for
Steven A. Varga, Chief
Operating Reactors Branch No. 1
Division of Licensing

Enclosures:
1. Amendment No. 61 to DPR-23
2. Safety Evaluation
3. Notice of Issuance

cc w/enclosures:
See next page

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F.R. NOTICE + AMENDMENT ONLY

OFFICE	ORB 1	ORB 1	ORB	AD:OR	OELD		
SURNAME	CParrish/	SMiner/rs	SVarga	TNovak	Karman		
DATE	11/13/81	11/13/81	11/13/81	11/13/81	11/13/81		

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

CAROLINA POWER AND LIGHT COMPANY

DOCKET NO. 50-261

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

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 61
License No. DPR-23

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

   A. The application for amendment by Carolina Power and Light Company (the licensee) dated November 11, 1981, 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. 61, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. Revise paragraph 3.I.a of Facility Operating License No. DPR-23 to read as follows:

   a. A primary to secondary pressure test at approximately 1825 psi differential shall be performed after operation at power levels such that estimated corrosion is equivalent to that of 24 effective full power days operation as shown in figure 4.3.3 in Attachment B of CP&L's letter of August 27, 1981. A period of seven additional calendar days is permitted for flexibility for scheduling the necessary test. This test shall be repeated after each interval of operation such that the estimated corrosion is equivalent to that of 241 effective full power corrosion equivalent days operation until the end of cycle 8 operation.

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

FOR THE NUCLEAR REGULATORY COMMISSION

Marshall Grotenhuis

Marshall Grotenhuis, Acting Branch Chief
Operating Reactors Branch No. 1
Division of Licensing

Attachment:
Changes to the Technical Specifications

Date of Issuance: November 13, 1981

ATTACHMENT TO LICENSE AMENDMENT

AMENDMENT NO. 61 TO FACILITY OPERATING LICENSE NO. DPR-23

DOCKET NO. 50-261

Revise Appendix A as follows:

Remove Pages	Insert Pages
2.3-1	2.3-1
2.3-2	2.3-2
2.3-3	2.3-3
3.5-7	3.5-7
3.5-7a	3.5-7a
3.5-10a	3.5-10a

2.3 LIMITING SAFETY SYSTEM SETTINGS, PROTECTIVE INSTRUMENTATION

Applicability

Applies to trip settings for instruments monitoring reactor power and reactor coolant pressure, temperature, and flow and pressurizer level.

Objective

To provide for automatic protective action in the event that the principal process variables approach a safety limit.

Specification

2.3.1 Protective instrumentation settings for reactor trip shall be as follows:

2.3.1.1 Startup protection

a. High flux, power range (low set point) $\leq$25% of rated power.

2.3.1.2 Core protection

a. High flux, power range (high set point) $\leq$109% of rated power.*

b. High pressurizer pressure $\leq$2385 psig.

c. Low pressurizer pressure $\geq$1835 psig.

*This setting limit shall be less than or equal to 92% of rated power when operating under the reduced temperature conditions described in the November 11, 1981 license submittal.

d. Overtemperature ΔT

$\leq \Delta T_o \{K_1 - K_2 (T - 575.4) + K_3 (P - 2235) - f(\Delta I)\}$*

where:

ΔT_o = Indicated ΔT at rated power, °F

T = Average temperature, °F

P = Pressurizer pressure, psig

K_1 = 1.1619

K_2 = 0.01035

K_3 = 0.0007978

and $f(\Delta I)$ is a function of the indicated difference between top and bottom detectors of the power-range nuclear ion chambers; with gains to be selected based on measured instrument response during plant startup tests such that:

(1) For $(q_t - q_b)$ within +12% and -17% where q_t and q_b are percent power in the top and bottom halves of the core respectively, and $q_t + q_b$ is total core power in percent of rated power, $f(\Delta I) = 0$. For every 2.4% below rated power level, the permissible positive flux difference range is extended by +1 percent. For every 2.4% below rated power level, the permissible negative flux difference range is extended by -1 percent.

(2) For each percent that the magnitude of $(q_t - q_b)$ exceeds +12% in a positive direction, the ΔT trip setpoint shall be automatically reduced by 2.4% of the value of ΔT at rated power.

(3) For each percent that the magnitude of $(q_t - q_b)$ exceeds -17%, the ΔT trip setpoint shall be automatically reduced by 2.4% of the value of ΔT at rated power.

*When operating under the reduced temperature conditions described in the November 11, 1981 license submittal, replace the number 575.4 with 537.9 in the overtemperature ΔT calculation.

e. Overpower Δ

$\leq \Delta T_o \, [\, K_4 - K_5 \frac{dT}{dt} - K_6 (T - T') - f(\Delta I) \,]$

where:

ΔT_o = Indicated ΔT at rated power, °F

T = Average temperature, °F

T' = Indicated average temperature at nominal conditions and rated power, °F*

K_4 = 1.07

$K_5 = \begin{cases} 0 \text{ for decreasing average temperature} \\ 0.2 \text{ seconds per °F for increasing average temperature} \end{cases}$

K_6 = 0.002235 for $T \geq T'$; K_6 = 0 for $T < T'$

f(ΔI) = as defined in d. above.

f. Low reactor coolant loop flow ≥90% of normal indicated flow

g. Low reactor coolant pump frequency ≥57.5 Hz

h. Under voltage ≥70% of normal voltage.

2.3.1.3 Other Reactor Trips

a. High pressurizer water level ≤92% of span

b. Low-low steam generator water level ≥14% of narrow range instrument span.

2.3.2 Protective instrumentation settings for reactor trip interlocks shall be as follows:

2.3.2.1 The low pressurizer pressure trip, high pressurizer level trip, and the low reactor coolant flow trip (for two or more loops) may be bypassed below 10% of rated power.

2.3.2.2 The single-loop-loss-of-flow trip may be bypassed below 45% of rated power.

*The value of T' for nominal conditions and rated power is 575.4°F. When operating under the reduced temperature conditions described in the November 11, 1981 license submittal, replace the number 575.4 with 537.9 in the overpower ΔT calculation.

TABLE 3.5-1

ENGINEERED SAFETY FEATURE SYSTEM INITIATION INSTRUMENT SETTING LIMITS

NO.	FUNCTIONAL UNIT	CHANNEL ACTION	SETTING LIMIT
1.	High Containment Pressure (HI Level)	Safety Injection*	$\leq$ 5 psig
2.	High Containment Pressure (HI-HI Level)	a. Containment Spray** b. Steam Line Isolation	$\leq$ 25 psig
3.	Pressurizer Low Pressure	Safety Injection*	$\geq$ 1700 psig
4.	High Differential Pressure Between any Steam Line and the Steam Line Header	Safety Injection*	$\leq$ 150 psi
5.	High Steam Flow in 2/3 Steam Lines***	a. Safety Injection* b. Steam Line Isolation	$\leq$ 40% (at zero load) of full steam flow $\leq$ 40% (at 20% load) of full steam flow $\leq$ 110% (at full load) of full steam flow
	Coincident with Low T_{avg} or Low Steam Line Pressure		$\geq$ 541°F T_{avg} **** $\geq$ 600 psig steam line pressure ****
6.	Loss of Power		
	a. 480V Emerg. Bus Undervoltage (Loss of Voltage) Time Delay	Trip Normal Supply Breaker	328 Volts $\pm$ 1 Volt .75 $\pm$ .25 sec.

TABLE 3.5-1 (Continued)

ENGINEERED SAFETY FEATURE SYSTEM INITIATION INSTRUMENT SETTING LIMITS

NO.	FUNCTIONAL UNIT	CHANNEL ACTION	SETTING LIMIT
6. (Cont'd)	b. 480V Emerg. Bus Undervoltage (Degraded Voltage) Time Delay	Trip Normal Supply Breaker	412 Volts ± 1 Volt 10.0 Second Delay ± 0.5 sec.
7.	Containment Radioactivity High	Ventilation Isolation	≤ 2 X Reading at the Time the Alarm is Set with Known Plant Conditions

* Initiates also containment isolation (Phase A), feedwater line isolation and starting of all containment fans.

** Initiates also containment isolation (Phase B).

*** Derived from equivalent ΔP measurements.

**** These setting limits shall be greater than or equal to 524°F and 450 PSIG when operating under reduced temperature conditions described in the November 11, 1981 license submittal.

TABLE 3.5-3 (Continued)

INSTRUMENTATION OPERATING CONDITIONS FOR ENGINEERED SAFETY FEATURES

NO.	FUNCTIONAL UNIT	1 MINIMUM CHANNELS OPERABLE	2 MINIMUM DEGREE OF REDUNDANCY	3 OPERATOR ACTION IF CONDITIONS OF COLUMN 1 OR 2 CANNOT BE MET
2.	CONTAINMENT SPRAY			
	a. Manual*	2	0**	Cold Shutdown
	b. High Containment Pressure* (Hi-Hi Level)	2/set	1/set	Cold Shutdown
3.	LOSS OF POWER			
	a. 480V Emerg. Bus Undervoltage (Loss of Voltage)	2/bus[a]	1/bus[b]	Maintain Hot Shutdown
	b. 480V Emerg. Bus Undervoltage (Degraded Voltage)	2/bus	1/bus	Maintain Hot Shutdown[c]

* Also initiates a Phase B containment isolation.
** Must actuate two switches simultaneously.
*** When primary pressure is less than 2000 psig, channels may be blocked.
**** When primary temperature is less than $547^{\circ}F$, channels may be blocked.(d)
***** In this case the 2/3 high steam flow is already in the trip mode.

(a) During testing and maintenance of one channel, may be reduced to 1/bus.
(b) During testing and maintenence of one channel, may be reduced to 0/bus.
(c) The reactor may remain critical below the power operating conditions with this feature inhibited for the purpose of starting reactor coolant pumps.
(d) When operating under the reduced temperature conditions described in the November 11, 1981 license submittal the channels may be blocked when primary temperature is less that $530^{\circ}F$.

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.

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 ΔT, overpower ΔT, 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

UNITED STATES NUCLEAR REGULATORY COMMISSION

DOCKET NO. 50-261

CAROLINA POWER AND LIGHT COMPANY

NOTICE OF ISSUANCE OF AMENDMENT TO FACILITY OPERATING LICENSE

The U. S. Nuclear Regulatory Commission (the Commission) has issued Amendment No. 61 to Facility Operating License No. DPR-23 issued to Carolina Power and Light Company (the licensee), which revised the Operating License and the Technical Specifications for operation of the H. B. Robinson Steam Electric Plant, Unit No. 2, (the facility) located in Darlington County, South Carolina. The amendment is effective as of the date of issuance.

The amendment revises the Technical Specifications to provide for reduced primary coolant temperature operation for the remainder of the current fuel cycle. In addition, the Operating License Condition 3.I.a is revised.

The application for the amendment complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations. The Commission has made appropriate findings as required by the Act and the Commission's rules and regulations in 10 CFR Chapter I, which are set forth in the license amendment. Prior public notice of this amendment was not required since this amendment does not involve a significant hazards consideration.

The Commission has determined that the issuance of this amendment will not result in any significant environmental impact and that pursuant to 10 CFR §51.5(d)(4) an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with issuance of this amendment.

For further details with respect to this action, see (1) the application for amendment dated November 11, 1981, (2) Amendment No. 61 to License No. DPR-23, and (3) the Commission's related Safety Evaluation. All of these items are available for public inspection at the Commission's Public Document Room, 1717 H Street, N. W., Washington, D. C. and at the Hartsville Memorial Library, Home and Fifth Avenues, Hartsville, South Carolina 29550. A copy of items (2) and (3) may be obtained upon request addressed to the U. S. Nuclear Regulatory Commission, Washington, D. C. 20555, Attention: Director, Division of Licensing.

Dated at Bethesda, Maryland, this 13th day of November 1981.

FOR THE NUCLEAR REGULATORY COMMISSION

Marshall Grotenhuis

Marshall Grotenhuis, Acting Branch Chief
Operating Reactors Branch No. 1
Division of Licensing