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JUN 1 3 1973

Docket No. 50-261

Carolina Power & Light Company
ATTN: Mr. E. E. Utley, Vice President
Bulk Power Supply Department
336 Fayetteville Street
Raleigh, North Carolina 27602

Change No. 19
License No. DPR-23

Gentlemen:

By letters dated January 27 and May 11, 1973, you requested that the requirement for hydrostatically testing the Robinson-2 steam generators each month be rescinded. In support of this request, you provided information with regard to the present condition of the steam generators and the control of secondary coolant chemistry.

We have evaluated the information provided, and we conclude that the steam generator tubes have been inspected to the extent necessary to identify degraded tubes, that these tubes have been plugged, and that the program described for control of the secondary coolant chemistry can provide assurance that degradation of the tubes has been arrested. To assure that the program is properly implemented, limiting conditions for operation and surveillance are required for the secondary system coolant and the steam generators. In this regard, appropriate changes to the Technical Specifications appended to License No. DPR-23 are identified by margin bars in Attachment A and designated as Change No. 19. Change No. 19 has been discussed with members of your staff.

We have determined that Change No. 19 does not involve a significant hazards consideration and that the health and safety of the public will not be endangered. The requirement for monthly hydrostatic testing of the steam generators is hereby rescinded and Change No. 19 is hereby effective.

Sincerely,

Original Signed by.
Donald J. Skovholt

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

Enclosure:
Attachment A (Change No. 19 to the Technical Specifications)

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cc:	See next page				
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cc: George F. Trowbridge, Esquire
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DATE ▶	6/13/73	6/13/73	6/13/73	6/13/73		

ATTACHMENT A

CHANGE NO. 19 TO THE TECHNICAL SPECIFICATIONS

CAROLINA POWER & LIGHT COMPANY

DOCKET NO. 50-261

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3.1.5 LEAKAGE

Specification:

3.1.5.1 If the primary system leakage exceeds 1 gpm and the source of leakage is not identified within 12 hours, the reactor shall be placed in the hot shutdown condition utilizing normal operating procedures. If the source of leakage exceeds 1 gpm and is not identified within 24 hours, the reactor shall be placed in the cold shutdown condition utilizing normal operating procedures.

3.1.5.2 If the sources of leakage have been identified and it is evaluated that continued operation is safe, operation of the reactor with a total leakage rate not exceeding 10 gpm shall be permitted. If leakage exceeds 10 gpm, the reactor shall be placed in the hot shutdown condition within 12 hours utilizing normal operating procedures. If the leakage exceeds 10 gpm for 24 hours, the reactor shall be placed in the cold shutdown condition utilizing normal operating procedures.

3.1.5.3 The leakage rate across the steam generator tubes shall be less than 0.3 gpm in each steam generator.

Basis:

Leakage from the Reactor Coolant System is collected in the containment or by the other closed systems. These closed systems are: the Steam and Feedwater System, the Waste Disposal System and the Component Cooling System. Assuming the existence of the maximum allowable activity in the reactor coolant, the rate of 1 gpm unidentified leakage is a conservative limit on what is allowable before the guidelines of 10CFR20 would be exceeded. This is shown as follows: If the reactor coolant activity is 50/$\bar{E}$ uCi/cc ($\bar{E}$= average beta plus gamma energy per disintegration in Mev) and 1 gpm of leakage is assumed to be discharged through the air ejector, the yearly whole body dose resulting from this activity at the site boundary, using an annual average $/Q = 2.00 \times 10^{-5}$ sec/m^3 is about the 10CFR20 guideline of 0.5 R/yr. [1,2]

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3.4 SECONDARY STEAM AND POWER CONVERSION SYSTEM

Applicability

Applies to the operating status of turbine cycle.

Objective

To define conditions of the turbine cycle steam-relieving capacity. Auxiliary Feedwater System and Service Water System operation is necessary to ensure the capability to remove decay heat from the core. To protect the steam generator tubes from degradation.

Specification

3.4.1 The reactor coolant shall not be heated above 350°F unless the following conditions are met:

(a) A minimum turbine cycle steam relieving capability of twelve (12) main steam safety valves operable.

(b) Two of the three auxiliary feedwater pumps must be operable.

(c) A minimum of 35,000 gallons of water in the condensate storage tank and an unlimited water supply from the lake via either leg of the plant Service Water System.

(d) Essential features including system piping and valves directly associated with the above components are operable.

(e) The main steam stop valves are operable and capable of closing in five seconds or less.

(f) The concentration of phosphate ions in the secondary coolant shall be greater than 10 ppm and less than 80 ppm.

(g) The molar concentration of sodium ions must be less than 2.6 times the molar concentration of phosphate ions (or the weight concentration of sodium ions must be less than 63% of the weight concentration of phosphate ions).

(h) The solution pH shall be within the range defined in Figure 3.4-1.

(i) The oxygen concentration must be less than 0.10 ppm.

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3.4.2 The iodine-131 activity on the secondary side of a steam generator shall not exceed 0.24 uCi/cc.

3.4.3 If, during power operations, any of the specifications in 3.4.1 or 3.4.2 above cannot be met within 24 hours, the operator shall initiate procedures to put the plant in the hot shutdown condition. If any of these specifications cannot be met within 48 hours, the operator shall cool the reactor below 350°F using normal procedures.

Basis

A reactor shutdown from power requires removal of core decay heat. Immediate decay heat removal requirements are normally satisfied by the steam bypass to the condenser. Therefore, core decay heat can be continuously dissipated via the steam bypass to the condenser as feedwater in the steam generator is converted to steam by heat absorption. Normally, the capability to return feedwater flow to the steam generators is provided by operation of the turbine cycle feedwater system.

The twelve main steam safety valves have a total combined rated capability of 10,068,845 lbs/hr. The total full power steam flow is 9,589,000 lbs/hr., therefore twelve (12) main steam safety valves will be able to relieve the total steam flow if necessary.(1) Following a loss of load, which represents the worst transient, steam flows are below the total capacity of the 12 safety valves. Therefore, overpressurization of the secondary system is not possible.

In the unlikely event of complete loss of turbine-generator and off-site electrical power to the plant, decay heat removal would continue to be assured by the availability of either the steam-driven auxiliary feedwater pump or one of the two motor-driven auxiliary steam generator feedwater pumps operated from the diesel generators and steam discharge to the atmosphere via the main steam safety valves and atmospheric relief.valves. One motor-driven auxiliary feedwater pump can supply sufficient feedwater for removal of decay heat from the plant.(2) The minimum amount of water in the condensate storage tank is the amount needed for at least 2-hours operation at hot standby conditions. If the outage is more than 2 hours, deep well or Lake Robinson water may be used.

An unlimited supply is available from the lake via either leg of the plant service water system for an indefinite time period.

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Stress corrosion of Inconel 600 steam generator tubing has been observed when scale forms on the tubes and/or free caustic (NaOH) is present in the secondary coolant. Dissolved oxygen also promotes stress corrosion of steam generator tubing. By maintaining phosphate concentrations in the 10-80 ppm range, a sodium to phosphate mol ratio less than 2.6/1 (or weight ratio less than 0.63/1), a coolant pH within the range shown in Figure 1, and oxygen levels below 0.1 ppm, scale formation can be prevented, free caustic and oxygen will not be present, and therefore intergranular stress corrosion of the steam generator tubing will not occur.[3]

The limit on secondary coolant iodine-131 specific activity is based on a postulated release of secondary coolant equivalent to the contents of three steam generators to the atmosphere due to a net load rejection. The limiting dose for this case would result from radioactive iodine in the secondary coolant. I-131 is the dominant isotope because of its low MPC in air and because the other shorter lived iodine isotopes cannot build up to significant concentrations in the secondary coolant under the limits of primary system leak rate and activity. One tenth of the iodine in the secondary coolant is assumed to reach the site boundary making allowance for plate-out and retention in water droplets. The inhalation thyroid dose at the site boundary is then:

$$\text{Dose (Rem)} = C \cdot V \cdot B \cdot DCF \cdot X/Q \cdot 0.1$$

Where: C = secondary coolant I-131 specific activity

= 0.24 curies/m^3 (uc/cc)

V = equivalent secondary coolant volume released = 135 m^3

B = breathing rate = 3.47×10^{-4} m^3/sec.

X/Q = atmospheric dispersion parameter = 8.9×10^{-4} m^3/sec.

0.1 = equivalent fraction of activity released

The resultant thyroid dose is less than 1.5 Rem.

References

(1) FSAR - Section 10.3
(2) FSAR - Section 14.2.5
(3) Letter to Licensing dated May 11, 1973 - Section 7, "Steam Side Water Chemistry Control Specifications."

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4.7 SECONDARY STEAM AND POWER CONVERSION SYSTEM

Applicability

Applies to periodic testing of secondary system components and surveillance of secondary coolant.

Objective

To verify the ability of secondary system components to function as required and to prevent system degradation.

Specification

4.7.1 The main steam stop valves shall be tested at each refueling interval or each 15 ± 3 months, whichever occurs first. Closure time of five seconds or less shall be verified. The valves are tested under no flow and at no load conditions.

4.7.2 The steam generators shall be pressure tested at each refueling interval or each 15 ± 3 months, whichever occurs first. Either of the following test conditions may be applied:

(a) 1900 psi pressure differential across the tube walls with the tube walls at 400°F, or

(b) 2300 psi pressure differential across the tube walls with the tube walls at the cold shutdown temperature.

4.7.3 The secondary coolant in each steam generator shall be sampled five days per week and analyzed for pH and concentrations of sodium and phosphate ions at all times when the temperature of the primary coolant is equal to or exceeds 350°F. If the secondary system chemistry conditions are not at equilibrium the sampling and analyses shall be performed daily.

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Basis

The main steam stop valves serve to limit an excessive Reactor Coolant System cooldown rate and resultant reactivity insertion following a main steam break incident. Their ability to close upon signal should be verified at each scheduled refueling shutdown. A closure time of five seconds was selected as being consistent with expected response time for instrumentation as detailed in the steam line break incident analysis.

The steam generator tubing represents one of the 3 major barriers against release of radioactive fission products to the environment. Steam generator corrosion has been observed on many operating PWR's. The integrity of this barrier in the event of a steam line break must be assured.

References

FSAR - Section 10.4

FSAR - Section 14.2.5

Letter to Licensing dated May 11, 1973 - Section 7, "Steam Side Water Chemistry Control Specifications"

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