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FACIL:50-261 H. B. Robinson Plant, Unit 2, Carolina Power and Ligh 05000261
AUTH.NAME AUTHOR AFFILIATION
UTLEY,E.E. Carolina Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION
HENDRIE,J.M. Commissioners

SUBJECT: Suppls 810311 petition for exemption from requirements of 10CFR50.48 & App R to 10CFR50.Info provided demonstrates adequacy of cable tray penetration configurations.Exemption from Section III.M is Jsutified & should be granted.

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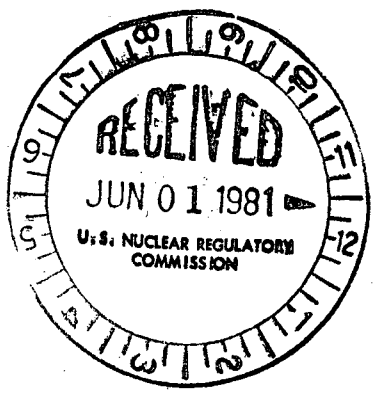

Honorable Joseph M. Hendrie, Chairman
United States Nuclear Regulatory Commission
Washington, D. C. 20555

H. B. ROBINSON STEAM ELECTRIC PLANT UNIT NO. 2
DOCKET NO. 50-261
LICENSE NO. DPR-23
SUPPLEMENT TO PETITION OF
CAROLINA POWER & LIGHT COMPANY
FOR EXEMPTION FROM CERTAIN REQUIREMENTS OF
10CFR50.48 AND APPENDIX R TO 10CFR PART 50

Dear Mr. Hendrie:

By letter dated March 11, 1981, Carolina Power & Light Company (CP&L) submitted to the Nuclear Regulatory Commission (NRC or the Commission) CP&L's petition for exemption from certain of the requirements of 10CFR50.48 and Appendix R to 10CFR Part 50 (sometimes referred to collectively herein as the fire protection rule) with respect to the H. B. Robinson Steam Electric Plant Unit No. 2 (Robinson).

Among other things, CP&L requested an exemption from Section III.M.2 of Appendix R to the extent that it would require that the difference between the temperature levels for the unexposed side of the cable penetration seals and the cable insulation ignition temperature for PVC be greater than that which was recorded during qualification testing.

In its petition, CP&L pointed out that the seal configuration at Robinson meets two of the acceptance criteria of the ASTM-E-119 test which are incorporated in Section III.M.(1) Specifically, the seals meet the acceptance criterion of Section III.M.1 in that there was no passage of flame or ignition of cable on the unexposed side of any penetration during the three-hour test. The seals meet criterion III.M.3 in that the fire barrier penetration seal remained intact and did not allow projection of water beyond the unexposed surface during the hose stream test. With respect to criterion III.M.2, temperature levels recorded for the unexposed side of the seals reached 829°F. The cable insulation ignition temperature is 850°F. The cable insulation did not reach ignition temperature. Thus, the penetration seals came very close to meeting this criterion as well.

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Since submitting its request for exemption, CP&L has continued its evaluation of the existing configuration of fire barrier cable penetration seals at Robinson. As will be discussed below, CP&L has determined that the ASTM-E-119 cable tray seal tests required to be performed by Section III.M are unrealistically conservative and, therefore, inappropriate with respect to Robinson. The existing cable tray penetration seal configurations are both adequate and conservative for the types and amounts of combustibles found at Robinson. The application of Section III.M to Robinson, therefore, will not meaningfully enhance fire protection safety at the plant. This fact coupled with the fact that the seals installed at Robinson meet two of the three acceptance criteria of this unrealistically conservative test fully justifies an exemption from Section III.M for Robinson.

As demonstrated by the table set forth as Attachment A (This table was included in the Robinson fire hazards analysis which was submitted to NRC on January 1, 1977), cable insulation constitutes the greatest percentage of combustibles in each fire zone.(2) In substantially lesser quantities there is lubricating oil (flash point >400°F, ignition temperature >600°F) and No. 2 fuel oil (flash point >150°F, ignition temperature >490°F). Most of the cable is PVC jacketed with Intumastic 285 fire retardant coating. The remaining cable is IEEE 383 qualified. Transient combustibles in each fire zone are limited by administrative procedures (Ref.: Plant Operating Manual, "Fire Protection Manual," Vol. 19, FPP-003, FPP-006, FPP-008, FPP-009, and FPP-010). Permanent storage of transient combustibles is not permitted in safety-related areas. Hot work and other ignition sources are controlled by permit and procedure so as not to provide potential fire sources (Ref.: Plant Operating Manual, Vol. 19, FPP-004 and FPP-005).

Fire zones containing No. 2 fuel oil ("A" and "B" Diesel Generator Rooms) contain no cable loadings and are separated from areas containing cables by three hour rated fire barriers. There are no seals of the configuration at issue in any of these barriers. The lubricating oil found in various areas of the plant is relatively noncombustible due to its high flash point and ignition temperature. During EPRI testing, it was found that lubricating oil could not be ignited even with an oxyacetylene torch.(3) The oil could be ignited only by adding heptane to the surface of the oil and using a propane torch as an ignition source. Thus, the two main potential sources of exposure fires at Robinson, i.e., No. 2 fuel oil and lubricating oil, pose an insignificant fire hazard.

From the facts set forth above, it is apparent that the main fire load at Robinson is the cable insulation itself; i.e., because the external fire hazard from fixed and transient combustibles is minimal, auto-ignition (as from e.g., a possible short circuit) is the only remaining source of ignition. In almost all cases, however, fire protection researchers consider the possibility of auto-ignition very remote due to the extremely high energy requirements for auto-ignition

initiation.[4] EPRI tests have indicated that for the type of cable predominantly installed at Robinson, the critical energy for auto-ignition would be 6010 kJ/m^2 with a critical flux of 5 kW/m^2.[5] Such extreme conditions are not foreseeable even under the most adverse electrical conditions. Severe electrical shorts generally occur at the load source, not along the cable, and usually result in tripping the power source breaker for the load thereby removing the heat source.[6] When electrically induced fires do occur, they do not propagate because they do not result in a fully developed cable tray fire.[7] Furthermore, the EPRI test results do not take into account the known fire retardant properties of coatings such as Intumastic 285. This coating material would inhibit propagation of any self-induced cable fires, thereby limiting the magnitude of a postulated fire.

It is clear, therefore, that the fixed and transient fire loadings present at Robinson constitute a minimal fire hazard. Because of the absence of a significant ignition source and fire loading, one cannot logically postulate for Robinson a fire of the magnitude and duration of that used in the ASTM-E-119 test (Ref.: The ASTM-E-119 test generally uses a fuel oil [or other hydrocarbon fuel] fire in a controlled manner to approximate the conditions shown in the standard "Time-Temperature Curve" [1000°F at 5 min., 1300°F at 10 min.,..., 1925°F at 3 hours]). The ASTM-E-119 test, therefore, represents an unrealistic and excessively conservative test for the cable tray penetration seals installed at Robinson.

The facts set forth herein demonstrate that the existing cable tray penetration configurations at Robinson are adequate for the types and amounts of combustibles found at Robinson. Under such circumstances, to require that the cable tray penetration seals in use at Robinson withstand the ASTM-E-119 test would not enhance fire protection safety at Robinson. Moreover, as CP&L has pointed out in its previous submittal, to require CP&L to replace the currently installed penetration seals may be detrimental to overall safety at Robinson. Because a large number of cables, including safety-related cables, pass through a small penetration area, it is essential that contact with those cables be minimized in order to reduce the risk of damage to the safety-related cables. For all of the reasons set forth herein, an exemption from Section III.M as requested by CP&L in its petition of March 11, 1981, is justified and should be granted.

Yours very truly,

M A McDuffie

for E. E. Utley
Executive Vice President
Power Supply and
Engineering & Construction

Attachment

SC/SFF/jc (7210)

cc: Mr. J. D. Neighbors

References

(1) National Fire Protection Association, "Standard Methods of Fire Tests of Building Construction and Materials," NFPA No. 251-1972, National Fire Protection Association, Boston, Mass., May 1971, Appendix A, Table II.

(2) Carolina Power & Light Company, "Fire Protection Program Review, APCSB 9.5.1, H. B. Robinson Unit No. 2," Carolina Power & Light Company, Raleigh, North Carolina, January 1, 1977.

(3) J. P. Hill and J. S. Newman, "Assessment of Exposure Fire Hazards to Cable Trays," EPRI Project RP-1165-1-1, Report EPRI NP-1675, prepared by Factory Mutual Research Corporation, Norwood, Mass., January 1981, p. 3-1.

(4) J. L. Lee, "A Study of Damageability of Electrical Cables in Simulated Fire Environments," EPRI Project RP-1165-1-1, Report EPRI NP-1767, prepared by Factory Mutual Research Corporation, Norwood, Mass., March 1981.

(5) Ibid, p. 3-17.

(6) Ibid, p. 1-1.

(7) G. L. Bennett, "Summary of Fire Protection Research Sponsored by the U. S. Nuclear Regulatory Commission," prepared for delivery at the 1979 Joint Power Generation Conference, Charlotte, North Carolina, October 10, 1979.

H. B. ROBINSON STEAM ELECTRIC PLANT
UNIT NO. 2
FIRE ZONE FIRE LOADING TABLE

Plant Fire Zone	Combustible Material	Quantity	Fire Load
1 - "B" Diesel Gen. Room	No. 2 Fuel Oil	200 gal.	49,300 B/ft^2
	Lubricating Oil	250 gal.	61,600 B/ft^2
2 - "A" Diesel Gen. Room	No. 2 Fuel Oil	200 gal.	49,300 B/ft^2
	Lubricating Oil	250 gal.	61,600 B/ft^2
3 - S.I. Pump Room	Cable Insulation	69 ft^3	41,600 B/ft^2
	Lubricating Oil	< 10 gal.	< 1695 B/ft^2
4 - Charging Pump Room	Lubricating Oil	120 gal.	21,400 B/ft^2
5 - Component Cooling Pump Room	Cable Insulation	66 ft^3	15,600 B/ft^2
6 - Hot Lab	Chemical & Lab Supp.	--	<40,000 B/ft^2
7 - Aux. Feedwater Pump Room	Lubricating Oil	4 gal.	2,550 B/ft^2
	Cable Insulation	17 ft^3	38,900 B/ft^2
8 - Boron Injection Tank Room	Charcoal Filter	240 lb.	8,100 B/ft^2
9 - North Cable Vault	Cable Insulation	49 ft^3	159,000 B/ft^2
10 - South Cable Vault	Cable Insulation	90 ft^3	75,300 B/ft^2
11 - First Floor Aux. Bldg. Hallway near Diesel Generators	Cable Insulation	134 ft^3	73,600 B/ft^2
12 - First Floor Aux. Bldg. Hallway at Air Compressors	Cable Insulation	138 ft^3	49,000 B/ft^2
	Lubricating Oil	<10 gal.	<1,000 B/ft^2
13 - First Floor Aux. Bldg. Hallway at Comp. Cooling Room	Cable Insulation	120 ft^3	63,200 B/ft^2
14 - Solid Waste Handling Room	Clothing, Paper, etc.	--	<40,000 B/ft^2
15 - Second Floor Aux. Bldg. Hallway	Cable Insulation	160 ft^3	44,900 B/ft^2
16 - Battery Room	Cable Insulation	13 ft^3	13,800 B/ft^2
17 - Control Room HVAC Room	Charcoal Filter	210 lbs.	3,600 B/ft^2

Fire Zone Fire Loading Table (continued)

Plant Fire Zone	Combustible Material	Quantity	Fire Load
18 - Old Unit 1 Cable Spread Room	Cable Insulation	36 ft^3	41,800 B/ft^2
19 - Unit 2 Cable	Cable Insulation	179 ft^3	85,100 B/ft^2
	Paper for Computer	24 ft^3	3,600 B/ft^2
20 - E1-E2 Room	Cable Insulation	303 ft^3	70,700 B/ft^2
21 - Rod Control Room	Cable Insulation	44 ft^3	24,500 B/ft^2
22 - Control Room	Cable Insulation	18 ft^3	5,000 B/ft^2
	Paper (Manuals, etc.)	240 ft^3	21,300 B/ft^2
23 - Hagan Room	Cable Insulation	18 ft^3	17,000 B/ft^2
	Paper (Manuals, etc.)	22 ft^2	6,600 B/ft^2
24 - Containment Cable Penetration Area	Cable Insulation	133 ft^3	61,300 B/ft^2
25A - "A" Reactor Coolant Pump Bay	Lubricating Oil	175 gal.	18,500 B/ft^2
25B - "B" Reactor Coolant Pump Bay	Lubricating Oil	175 gal.	18,500 B/ft^2
25C - "C" Reactor Coolant Pump Bay	Lubricating Oil	175 gal.	18,500 B/ft^2
26 - Containment General Area	Cable Insulation	578 ft^3	53,400 B/ft^2
	Charcoal Filters	420 lb.	1,000 B/ft^2
27 - RHR Pump Pit	Lubricating Oil	16 gal.	6,200 B/ft^2
28 - Pipe Alley	Cable Insulation	130 ft^3	30,500 B/ft^2

NOTES:

1. Zones 1, 2, 9, and 10 are protected by automatic total flooding CO_2 Systems.
2. Zones 12, 14, 24, 25A, 25B, and 25C are protected by Pre-Action Sprinkler Systems.
3. Zones 19 and 20 are protected by automatic Halon 1301 Suppression Systems.
4. All cable located inside the Auxiliary Building (Zones 1 - 23 and 27 and 28) are coated with Intumastic 285 cable coating material.