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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
CAROLINA POWER & LIGHT COMPANY and NORTH CAROLINA EASTERN MUNICIPAL POWER AGENCY	)	Docket No. 50-400 OL
	)	
(Shearon Harris Nuclear Power Plant)	)	

APPLICANTS' SUPPLEMENTAL TESTIMONY
OF MARGARETA A. SERBANESCU
IN RESPONSE TO EDDLEMAN CONTENTION 116
(FIRE PROTECTION)

D503

Q.1 What is the purpose of your Supplemental Testimony?

A.1 This testimony supplements my pre-filed statement of August 9, 1984 to reflect certain changes to Applicants' Fire Hazards Analysis which have been made subsequent to August 9, 1984. The revisions to the Fire Hazards Analysis are reflected in the Shearon Harris Nuclear Power Plant (SHNPP) Final Safety Analysis Report (FSAR) Section 9.5.1 and Appendix 9.5A (Applicants' Exhibit ___).

Q.2 Why have there been changes to the SHNPP Fire Hazards Analysis since your pre-filed testimony was submitted to the Board?

A.2 Because of a change in the design criteria for cable tray loadings and the availability of more specific information on the calorific values of the cable installation used in the SHNPP, a re-evalaution of calculations for determining combustible loads in each Fire Area was performed.

Q.3 Please describe the changes in the calculation of combustible loads in the Fire Areas and the changes in assumptions which have led to the revisions to those calculations.

A.3 There have been four principal changes to the calculation of combustible loads in each Fire Area:

(1) A specific calorific value for diesel fuel oil of 140,000 BTU per gallon has been assigned. Originally diesel fuel oil was considered in the general category of combustible or flammable liquids with a calorific value of 108,000 BTU per gallon. The value of 140,000 BTU per

gallon is more specific and more conservative. See National Fire Protection Association Handbook, 14th Edition, Table 7-3B, Characteristics of Fuel Oil.

(2) The calorific value per running foot (RF) of a typical twenty-four inch wide, 40% loaded cable tray has been increased. Generic data was previously employed because the actual cables to be used at the SHNPP had not been determined. Cables specific to SHNPP have now been selected which allow the development of specific calorific values. These changes from previous calculations can be summarized as follows:

	Previous (BTU/RF)	Current (BTU/RF)
Power Cable	180,000	200,000
Control Cable	157,000	170,000
Intrumentation	95,000	155,000

These changes in assumptions and in data are reflected in the revisions now incorporated in Applicants' Exhibit ___.

(3) Adjustments have been made for maximum allowable electrical cable tray fill to reflect plant design changes. Original calculations assumed that each cable tray was filled to 40% -- then the maximum allowable by design. A re-evaluation of the strength of seismic supports has verified sufficient support to allow Control and Instrumentation Cable Trays to be filled to a maximum of 60%. On the other hand ampacity/derating requirements

have established a limit of 30% maximum fill for Power Cable Trays. These revised maximum design cable tray fills have been used in the updated calculations for combustible loadings.

(4) Adjustments have been made for actual electrical cable tray width and height. Original calculations assumed all trays had a maximum fill depth of 4 inches. More recent plant specific data indicates actual maximum fill depths of 4 and 5 1/4 inches for horizontal runs of cable trays and 6 inches for cable risers.

Q.4 What impact, if any, have these changes in the calculations of combustible load in the Fire Hazards Analysis had on the conclusions that you reached in your testimony filed on August 9, 1984?

A.4 There is no impact on the overall conclusions. The calculated values of combustible loads in most Fire Areas has increased somewhat. We first recalculated combustible loads in each Fire Area with the conservative assumption that all cable trays will be filled to a maximum of 60% capacity (except for Power Cable Trays which are limited to 30% capacity). Based on this very conservative approach, the combustible loadings of all but five of the thirty-two Fire Areas were calculated to be less than 240,000 BTUs per square foot. Two of these five Fire Areas were previously identified in my pre-filed statement of August 9, 1984. With regard to the additional three Fire Areas, these were identified as cable spreading rooms 1A and 1B and the Auxiliary Control (Panel) Room. We then calculated a more accurate combustible loading for these three rooms, utilizing the actual cable tray fill as indicated in the more recent cable and conduit list available. This list represents the most recent information concerning quantity and routing of electrical cable available to us, and is considered to include virtually all cable trays contemplated in final plant design. We calculated an average actual cable tray fill for each cable tray within each of these three Fire Areas and added approximately 5% fill to accommodate potential future additional cables. The resultant combustible loads indicated values well below 240,000s BTUs per square foot and thus there was no impact on the conclusions reached in the Fire Hazards Analysis. The results of these revisions are set forth in Applicants' Exhibit ___.

Q.5 Have there been any other revisions to the Fire Protection Program that are reflected in the Fire Hazards Analysis?

A.5 Yes, there has been a change to the smoke removal philosophy for the SHNPP Fire Protection Program. The supply and exhaust ventilation systems are now being provided with fire dampers in ducts which pass through three hour fire-rated barriers. This is being done to maintain the integrity of the fire barriers which enclose Fire Areas. Thus these ducts, which are capable of automatically removing smoke generated by a fire, will now be subject to damper closure when the fusible link of the damper is subjected to a pre-determined temperature. As individual dampers close, the initial smoke removal capability diminishes. In addition, air duct smoke detectors automatically stop the fans in the ventilation system.

Q.6 What impact does this change have on the ability of the plant to remove smoke from an area to permit the fire brigade to enter the area, assess fire conditions and use manual equipment to fight the fire?

A.6 None. The ventilation system can be restored to a smoke removal mode by manual actuation from the Plant Control Room. In addition, the automatic shutdown features can be overridden by the plant operator. The fire brigade has at its disposal portable smoke ejection equipment as well as self-contained breathing apparatus for negating the adverse effect of smoke on members responding to a fire condition. This change reflects a well established school of thought in fire protection which favors "bottling up" an area and removing a continuing source of available oxygen to sustain a fire. This allows the fire brigade to make a determination that smoke removal is necessary in order manually to fight the fire.

Q.7 On page 16, lines 13-16, of your August 9, 1984 pre-filed testimony, you state: "Each Fire Area is bounded by barriers with construction that provides a minimum three-hour fire rating (with the one exception of emergency diesel generator rooms, described previously)." Do you wish to clarify this statement?

A.7 Yes. Each Fire Area located inside the structure of the power block is bounded by barriers with construction that provides a minimum three-hour fire rating, with the exception of special doors, bullet resistant doors and air-tight doors which have not been fire tested. However, the design of these doors should provide equivalent protection in case of fire. In addition, the transfer air ducts from the reactor auxiliary building (HVAC equipment room) to the tank area elevation 286' do not contain fire dampers because the tank area has a negligible combustible loading. Walls and roofs forming the outside structure of the power block and remote buildings (i.e., Diesel Generator Building and Emergency Service Water Intake Structure) are constructed of reinforced concrete providing a three-hour fire rating -- again with the exception of special doors (i.e., tornado, wind and missile doors) and the air exhaust and intakes at exterior walls, stacks and roofs. Because these walls are not contiguous with Fire Areas, it was not necessary to provide fire dampers.

Q.8 Does this complete the additions or changes that you wish to make to your pre-filed testimony of August 9, 1984

A.8 Yes