July 31, 1985

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
GEORGIA POWER COMPANY, et al.	)	Docket Nos. 50-424 (OL)
	)	50-425 (OL)
(Vogtle Electric Generating Plant, Units 1 and 2)	)	
	)	

APPLICANTS' STATEMENT OF MATERIAL FACTS AS TO WHICH THERE IS NO GENUINE ISSUE TO BE HEARD REGARDING JOINT INTERVENORS' CONTENTION 10.1 (DOSE-RATE EFFECTS)

Pursuant to 10 C.F.R. § 2.749(a), Applicants submit, in support of Applicants' Motion for Summary Disposition of Joint Intervenors' Contention 10.1, that there is no genuine issue to be heard with respect to the following material facts:

1. To simulate the aging effects attributable to the low dose-rate radiation environment to which certain equipment important to safety would be exposed over its normal life, such equipment is often exposed to radiation at a high dose rate for a relatively short period of time. The generally accepted industry practice has been to use dose rates on the order of 0.01

to 1.0 megarads/hr for this purpose. Affidavit of Joel Kitchens, Victor Gonzales, and Mark L. Mayer, ¶¶ 3-5.

2. When an artificially high dose rate is used to simulate aging attributable to radiation, the possibility of dose-rate effects arises. The term dose-rate effects means that the amount of degradation experienced in an irradiated material is dependent not only on the total integrated dose, but also on the application rate of the radiation. Dose rates are not a concern for the portion of the environmental qualification testing that simulates accident conditions, since the dose rates used in testing are comparable to the actual dose rate that would be experienced during the most severe design basis accident. Id., ¶ 6.

3. The possibility of radiation dose-rate effects has been recognized for at least 15 years. To compensate for such effects, a greater total dose than the service lifetime dose is applied to simulate aging due to irradiation. Id., ¶ 7.

4. In 1981, K. T. Gillen and R. L. Clough of Sandia National Laboratories conducted a study of dose-rate effects in ethylene propylene rubber (EPR), cross-linked polyolefin (XLPO), chloroprene (Neoprene), and chlorosulfonated polyethylene (Hypalon). Gillen and Clough studied the degradation of tensile properties (tensile strength and elongation) of

these polymers when subjected to radiation applied at different rates. Id., ¶ 8, 25.

5. Gillen and Clough's investigations were prompted by the discovery of dose-rate effects in simple polyethylene. Simple polyethylene has not been identified in any safety-related application at VEGP. Id., ¶¶ 18, 24.

6. Gillen and Clough observed dose-rate effects in EPR, XLPO, Neoprene and Hypalon. These effects were much smaller than those previously observed in simple polyethylene. In addition, the degradation caused by the various dose-rates decreased as the total dose decreased. Id., ¶¶ 26-27.

7. In the case of Hypalon and EPR, up to a total integrated dose of 20 megarads, the reduction of tensile properties is virtually the same for all dose rates. In the case of Neoprene, the reduction is virtually the same up to a total integrated dose of 10 megarads regardless of the dose rate chosen. Id., ¶ 28.

8. At VEGP, no equipment important to safety will receive a total integrated dose for 40 year normal operation greater than 10 megarads; and most such equipment will receive less than one megarad. Id.

9. Of the four polymers studied, only XLPO exhibited dose-rate effects that were discernible below 10 megarads. Id., ¶ 29.

10. The only safety-related application of XLPO identified at VEGP is cable insulation. A more recent study by Sandia has demonstrated that degradation of the mechanical properties of XLPO insulation does not prevent cable from performing its electrical function. Id., ¶¶ 30-31.

11. Duke Power Company tests of cable in Oconee Nuclear Generating Unit No. 1 have also confirmed the suitability of XLPO-insulated cable for a nuclear environment. Samples of cables, including cables with EPR or XLPO insulation and Neoprene jacketing, were removed after five and ten years of operation. In all cases, the cables were in good condition with no more deterioration than would be observed over a similar period in a non-nuclear environment. Id., ¶¶ 35-39.

Respectfully submitted,

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