October 21, 1983

Docket No. 50-395

- MEMORANDUM FOR: Elinor G. Adensam, Chief Licensing Branch No. 4 Division of Licensing
- FROM: Jon B. Hopkins, Project Manager Licensing Branch No. 4 Division of Licensing
- SUBJECT: FORTHCOMING MEETING WITH SOUTH CAROLINA ELECTRIC & GAS COMPANY - VIRGIL C. SUMMER NUCLEAR STATION
- DATE & TIME: Tuesday, November 1, 1983 8:30 a.m.
- LOCATION: Gilbert Associates, Inc. Reading, PA
- PURPOSE: To audit equipment qualification analyses performed for the licensee's Seismic Confirmatory Program, and to discuss the enclosed NRC staff questions.
- PARTICIPANTS: NRC Staff
 - J. Hopkins
 - A. Lee
 - M. Subudhi (Consultant)

South Carolina Electric & Gas Company

R. Whorton, et al.

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Jon B. Hopkins, Project Manager Licensing Branch No. 4 Division of Licensing

Enclosure: NRC Staff Questions

cc: See next page

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Mr. O. W. Dixon, Jr. Vice President, Nuclear Operations South Carolina Electric & Gas Company P.O. Box 764 (Mail Code F-04) Columbia, South Carolina 29218

cc: Mr. Henry Cyrus Senior Vice President South Carolina Public Service Authority 223 North Live Oak Drive Moncks Corner, South Carolina 29461

> J. B. Knotts, Jr., Esq. Debevoise & Liberman 1200 17th Street, N.W. Washington, D. C. 20036

Mr. Mark B. Whitaker, Jr. Group Manager - Nuclear Engineering & Licensing South Carolina Electric & Gas Company P.O. Box 764 Columbia, South Carolina 29218

Resident Inspector/Summer NPS c/o U. S. Nuclear Regulatory Commission Route 1, Box 64 Jenkinsville, South Carolina 29065

James P. O'Reilly, Regional Administrator U.S. Nuclear Regulatory Commission, Region II 101 Marietta Street Atlanta, Georgia 30303

V. C. Summer Seismic Confirmatory Program Areas Requiring Additional Information

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- Staff needs confirmation prior to November 16, 1983 that the review of the ASLB seismic input for equipment and components is complete and no modification is required for any equipment.
- For any NSSS and BOP equipment item originally qualified to single frequency test table motion, clarify that operability of such equipment will be maintained against ASLB input motion which contains high frequency components. Special attention should be given to relay chattering and its impact on safety systems.
- Summarize insights obtained during the conduct of the seismic confirmatory program regarding the effect of high frequency input on equipment types.
- 4. Effect of ASLB Seismic input on passive components was studied on a generic basis using nonlinear analysis of single degree of freedom (SDOF) oscillators. The licensee presented several curves showing the severity of SSE input motion compared to the ASLB input motion based on the ductility demand for inelastic SDOF oscillators. Because of the generic nature of the approach and relative measures of comparison used; several areas, as detailed below, needed clarification:
 - (a) Non linear method of analysis used should be verified by showing a curve of maximum response amplitude of a range of SDOF oscillators against a number of harmonic forcing frequencies; also identify the region of frequency when multiple responses (jump) are observed as in the case of response from Duffing's equation (Ref. Shock and Vibration Handbook Second Edition, Published by McGraw Hill, 1976). A discussion should be provided to indicate how maximum response is obtained through comparison against simple experimentally observed results, if feasible.
 - (b) As discussed in NUREG/CR-0098 "Development of Criteria for Sejsmic Review of Selected Nuclear Power Plants" by Newmark and Hall, the elastic acceleration response spectrum is not reduced beyond frequency values greater than 33 Hz even when inelastic behavior is considered. Perhaps this situation is reflected in the curve for 40 Hz oscillator presented during the meeting of October 11, 1983. For high frequency oscillators (greater than 33 Hz) total force may be a better measure for showing the effect of inelastic response when comparing the severity of input motion. Some results comparing the total forces from the SSE and ASLB input considering inelastic behavior of the oscillator should help the staff in accepting the generic approach proposed by the licensee.

MEETING NOTICE DISTRIBUTION

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NRC PARTICIPANTS

J. Hopkins

A. Lee

M. Subudhi (Consultant)

bcc: Applicant & Service List