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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

MAY 6 1980

Docket No.: 50-395

Mr. E. H. Crews, Jr.
Vice President and Group Executive
Engineering and Construction
South Carolina Electric and Gas Company
P. O. Box 764
Columbia, South Carolina 29218

Dear Mr. Crews:

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION ON THE FINAL SAFETY ANALYSIS REPORT FOR THE VIRGIL C. SUMMER NUCLEAR STATION

As a result of our review of the Final Safety Analysis Report (FSAR) for the Virgil C. Summer Nuclear Station, we find that we need additional information to complete our review. The enclosure contains requests for information and positions which cover the area of geology and seismology. After you have reviewed the requests, we request that you provide us with your schedule for providing responses.

Sincerely,

A. Schwencer

A. Schwencer, Acting Chief
Licensing Branch No. 3
Division of Project Management

Enclosure:
As stated

cc: See next page

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Questions Re: V. C. Summer Site FSAR

361.0 GEOSCIENCES

361.12 The microlocation of seismicity associated with Monticello reservoir comprises three major zones (Teledyne Geotech Technical Report 79-8, pages 11-17): (a) a single zone near the north end of the reservoir; (b) an east-west zone, containing possibly four subzones, across the central part of the reservoir; and (c) a zone near the southern end of the reservoir consisting possibly of two subzones. Produce composite fault plane solutions of each zone (or subzone, where possible). Include first motions derived from MEQ-800 portable seismographs and the six-station USGS network (Talwani, Induced Seismicity and Earthquake Prediction Studies in South Carolina, 1979, page 16).

361.13 Discuss the relationship between the stress field determined from the fault plane solutions and (a) local (< 150 km) structural/tectonic geology and (b) stress field determined in the two USGS deep wells located west and southwest of the reservoir (Talwani, Induced Seismicity and Earthquake Prediction Studies in South Carolina, 1979, page 21).

361.14 On the basis of the more recent seismicity reports by Teledyne Geotech (through 1978) and Talwani (January-September, 1979) for Monticello Reservoir, update the discussions of the spatial and temporal distribution of hypocenters and their relationship to the local (< 150 km) structural/tectonic geology.

361.15 Arguments are presented that earthquakes under Monticello reservoir cannot be very large because of the shallow focal depths of 0.5 km. Two problems exist with that argument: (a) the assumption is made that the vertical extent of the fault plane equals the focal depth, and (b) calculated focal depths are as much as 4 kilometers (Talwani, Technical Report 79-3, 1979). Justify the assumption (a), or a different assumption that can be justified. Determine whether new evidence exists that the focal depths are really different than those published (Talwani, Technical Report 79-3, 1979). Using the justified assumption and the most recent estimates of focal depth, estimate the maximum probable earthquake under Monticello Reservoir. Discuss the limitations or uncertainties of that estimate.

361.16 A graph of the common logarithm of cumulative number of events of magnitude, M, or greater can be plotted as a function of M. Such a graphical representation is useful in describing the seismic history of a seismic zone. Insofar as an assumption can be made that the magnitude distribution will continue as it has been, estimates of future seismicity can be made from the graph. Although the latter assumption is not always tenable, such a graph is a useful resource in describing seismicity levels. Therefore, produce a graphical representation of magnitude-cumulative frequency of occurrence for all events assumed to be associated with the reservoir impoundment. From this curve estimate the maximum probable magnitude per year, per decade, and per the life of the plant. (See, for example, Teledyne Geotech Technical Report No. 79-8, page 27, Figure 8). Compare these to the maximum probable event obtained in the previous question based on focal depth considerations. Discuss the limitations or uncertainties of those estimates.

361.17 Using historical earthquake catalogs for the southeastern U.S., and excluding the microearthquakes induced by Monticello Reservoir, obtain recurrence intervals for Modified Mercalli (M.M.) epicentral intensities, I_o, for (a) I_o = VIII within 100 km of the V. C. Summer Site and (b) I_o = IX within 225 km of the site.

361.18 The USGS measured _in situ_ stresses at greater depths than those reported in the FSAR (Appendix 2D). Summarize those measurements using whatever material that can be obtained from Mark Zoback. Do those data support the hypothesis that _in situ_ normal and shear stresses are sufficiently close to shear movement along preexisting planes of weakness that raising pore pressures to hydrostatic levels governed by Lake Monticello has caused the observed seismicity in the area of the stress measurements? What is the maximum credible stress drop that might occur from the greatest observed (S_1-S_3) stress conditions? Could the site response from that stress drop exceed the design earthquake response?

361.19 On page 2.5-14, paragraph 1, it is reported that McKenzie postulated northwest trending faults with 1500 feet of displacement. What evidence has been observed which supports the conclusion that these "faults" are an unsupported hypothesis by McKenzie.