TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401
830 Power Building

REGULATORY DOCKET FILE COPY

June 26, 1978

Mr. Roger S. Boyd, Director
Division of Project Management
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Boyd:

In the Matter of the Application of	)	Docket Nos. 50-327
Tennessee Valley Authority	)	50-328
		50-390
		50-391
		50-438
		50-439

We have reviewed your letter of May 30, 1978, to N. B. Hughes, the NRC staff Working Group report, and the recommended approaches for favorable resolution of the issue of concern. TVA appreciates the manner in which the NRC Working Group and other NRC staff representatives have cooperated with us to define a course of action which would allow a timely resolution of the staff's concern. We recognize the three courses of action recommended in your letter to be viable approaches and are now evaluating each one with respect to the manpower, schedule, and cost requirements. When the evaluation is completed, we will advise you of the results. However, we previously considered each approach outlined in the Working Group report and believe that a resolution on a geology and seismology basis offers the best chance of concluding this matter on a timely basis. The NRC staff originally recommended this approach in our early meetings and discussions of the problem, and we concurred with the recommendation.

TVA elected to present information to resolve the staff's concern in two phases. Phase I, consisting primarily of additional justification for a reduced intensity for the Giles County earthquake and for rock sites and demonstrating the applicability of intensity-acceleration relationships other than the Trifunic-Brady relationship, was submitted for NRC review in June 1978. Phase I addresses items III.A.3, III.A.4, and III.B.3 of the Working Group report. Phase II, dealing with the examination of recorded earthquakes of magnitudes similar to the Giles County event and the development of site-specific response spectra, will be submitted to the staff for review in August 1978. Phase II will address items III.B.1,

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III.B.2, III.B.6, and III.C.1.a of the Working Group report. We believe that these reports, taken together, will be sufficient to demonstrate the adequacy of the present plant designs, and that no detailed reanalyses of structures or equipment are necessary.

The three approaches to the resolution of this concern recommended in your May 30 letter all involve the evaluation of margins in structural design and/or the actual reanalysis of structures themselves. It has long been recognized by TVA, industry, and the NRC staff that there are many margins and conservatisms inherent in the design process. For example, the Working Group report recognizes a 10 to 15 percent margin inherent in design based on differences in actual material properties and design code values. Other examples are discussed by G. W. Housner and P. C. Jennings in the report, "Earthquake Design Criteria for Structures," EERL 77-06, November 1977. In the "Comments on Conservatism in Earthquake Restraint Design," N. M. Newmark estimates that the net probability of failure of nuclear power plant structures under seismic conditions is between 2×10^{-8} and 10^{-9} and suggests some relaxation of seismic requirements for nuclear power plant structures. On the Hartsville docket, we showed from case studies of structures subjected to earthquake ground motion that seismically designed structures resisted earthquakes larger than the earthquake for which they were designed. However, based on our experience, we believe that to quantify these conservatisms to the satisfaction of the NRC staff would require a great amount of reanalysis for each structure even if a total reanalysis of structures was not required. Therefore, in order to avoid, if possible, long delays and considerable costs associated with the reanalysis of structures, we believe the resolution of the staff's concern should be pursued to its fruition on a geology and seismology basis.

As a part of our continuing investigation for future power plant sites, TVA has been involved in a study to better define the seismo-tectonic province in the eastern portion of the TVA area. We are performing aeromagnetic, gravity, seismicity, and remote sensing studies. The study includes an investigation of the epicentral area of the Giles County earthquake and the Southern Appalachian Tectonic Province and is similar in nature to the studies conducted for the Pilgrim and WPSS plants which have been reviewed and accepted by the staff. Conclusions of this study may result in association of the Giles County earthquake with a tectonic structure or subdivision of the Southern Appalachian Tectonic Province. If the staff's concern has not been resolved after review of the Phase I and II studies, TVA proposes to submit a report on this study for the NRC staff's review as Phase III of our approach in order to provide additional justification for the existing seismic design bases. The study has progressed to a point where a meaningful report can be submitted in late September for staff review.

Mr. Roger S. Boyd

June 26, 1978

In summary TVA believes that the staff's concern can be resolved on a geology and seismology basis with our Phase I and Phase II submittals. In addition, if necessary, we will submit our Phase III study. We will be glad to meet with the staff to discuss this effort in the near future.

Very truly yours,

J. E. Gilleland

J. E. Gilleland
Assistant Manager of Power