May 24, 1988

Docket Nos.: 50-413
and 50-414

Mr. H. B. Tucker, Vice President
Nuclear Production Department
Duke Power Company
422 South Church Street
Charlotte, North Carolina 28242

Dear Mr. Tucker:

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION CONCERNING THE DIRECT GENERATION RESPONSE SPECTRA AND THE SNUBBER REDUCTION PROGRAM - CATAWBA NUCLEAR STATION, UNITS 1 AND 2 (TACS 67359/67360)

The NRC staff has reviewed your submittal dated February 24, 1988, concerning the direct generation response spectra and the snubber reduction program. We find that additional information, as identified in Enclosures 1 and 2, is required before we can complete our review.

Your response to the enclosures is requested within 45 days from the date of this letter. Please contact me at (301)492-1496 if you have any questions.

The reporting and/or recordkeeping requirements contained in this letter affect fewer than ten respondents; therefore, OMB clearance is not required under P. L. 96-511.

Sincerely,

Original signed by:

Kahtan N. Jabbour, Project Manager
Project Directorate II-3
Division of Reactor Projects I/II

Enclosures:
As stated

cc w/enclosures:
See next page

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ENCLOSURE 1

STRUCTURAL AND GEOSCIENCES BRANCH
DIVISION OF ENGINEERING AND SYSTEMS TECHNOLOGY
REQUEST FOR ADDITIONAL INFORMATION

I. GENERAL COMMENT

1. With reference to Your February 24, 1988, letter (page 2, first paragraph), provide the technical basis for your statement that, "the Direct Generation method results in more accurate Design Response Spectra". Additionally, a reference to NRC's NUREG/CR 1161 was made presuming that the Direct Generation method was recommended by NRC staff. It should be noted that positions or recommendations of a NUREG/CR report do not represent staff positions and should not be construed as such. However, the proposed revised version (published for public comments) of SRP 3.7.2 (Ref. 1) allows the use of direct solution methods but requires a review of such methods on a case by case basis.

II. SPECIFIC REQUEST FOR INFORMATION

1. When proposing a generally unverified or yet to be proven dynamic analysis method for use in qualifying seismic design adequacy of safety related structures, systems and equipment, a mere comparison of limited analysis results with one set of time history analysis based on one single structural model appears to be inadequate. A more vigorous justification of the method is needed. Specifically, provide any applicable test verification data which support the general applicability of the direct generation method.

2. The licensing basis for Catawba Station utilizes the Newmark Spectra, termed as Design Response Spectra (DRS), anchored at 0.15g peak ground acceleration (PGA) for design of structures. In the staff's Safety Evaluation Report (Ref. 2), it was pointed out that the site specific spectra based on Perry and Wolf Creek site analyses exceed the Catawba DRS by 15 to 16% between the frequencies of 3 to 10 Hz. However, the average spectrum of the four synthetic time-histories used in generating the floor response spectra exceeds the site specific spectrum at all frequencies. Thus, the staff had accepted a dual approach for design purposes (DRS for structural design, average spectrum obtained from the synthetic time-histories for equipment design). Your proposed approach is based upon the direct generation of the floor response spectra from the DRS. Provide information on how the exceedance of site specific spectra is incorporated in the proposed approach.

3. Provide the basis for the frequency interval selection used in the direct generation method.

4. With reference to page 3.7-17, provide a detailed discussion of verification work done on the Equipment Dynamic Analysis

Package (EDASP). As applicable, provide an actual comparison and verification results of EDASP with respect to observed floor responses of a nuclear power plant with known ground responses (e.g., Humbolt Bay records) to support the validity of the EDASP.

5. Pages 3.7-17 thru 3.7-17e primarily represent a direct copy of a referenced paper (Ref. 33 in your February 24, 1988, submittal) without any discussion of the rationale, assumptions and limitations of the method. Specifically, the impact on the reliability of the method due to the lack of an indepth study regarding the effect of varying the effective duration of the strong motion portion of the earthquake, "T", and the probability of exceedance "r" should be discussed. Also, provide justifications regarding the EDASP's applicability to category I structure floor response analysis considering the fact that the method is primarily developed for component test/qualification work.

6. Provide clarification of the paragraph (page 3.7-17d) starting with "A power spectral ... EDSAP program." Also, provide a step-by-step procedure used to obtain the values of Table 3.7.1-1.

References:

1. Resolution of USI A-40, "Seismic Design Criteria - Draft Revision of Standard Review Plan 2.5.2, 3.7.1, 3.7.2 & 3.7.3."

2. "Safety Evaluation Report Related to the Operation of Catawba Nuclear Station, Units 1 and 2", NUREG-0954, Supplement No. 1, April 1983.

ENCLOSURE 2

MECHANICAL ENGINEERING BRANCH
DIVISION OF ENGINEERING & SYSTEMS TECHNOLOGY
REQUEST FOR ADDITIONAL INFORMATION

1. State the conditions under which the option is chosen to use the alternative set of damping values for piping, as shown in Section 3.7.1.3. Note that under the conditions stated in Regulatory Guide 1.84, Rev. 4, the alternative set of damping values as stated may not be acceptable to be used for piping analyses based on floor spectra generated by the Direct Generation Method.

2. ASME Section III, Subsection NF, indicates that loads due to piping restraint of free end displacement should be included in the design of supports under Service Level D conditions. State why thermal loads are not included in the load combination for faulted conditions shown in Table 3.9.3-11.

3. The Direct Generation Method is stated to having been proven an accurate method for generating floor response spectra. Provide a detailed discussion showing the basis for this assertion, and provide supporting experimental data if available.

4. Indicate if peak broadening per Regulatory Guide 1.122 will be applied to the floor spectra generated by the proposed method.

5. Indicate how this procedure is used for a structure with different damping values.

6. Provide the data in Tables 3.7.1-1 in graphical form, from 1 to 40 Hz.