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Room No. 550
Phillips Building
7920 Norfolk Avenue
US Nuclear Regulatory Commission
Bethesda, MD 20014

SUBJECT: REQUEST FOR INFORMATION BY TES.

REFERENCES:

(1) NUREG/CR-2834, "Independent Seismic Evaluation of the Diablo Canyon Unit 1 Containing Annulus Structure and Selected Piping Systems.

(2) TES RFI Control No. 5511-0151.

(3) TES RFI Control No. 5511-0152.

Gentleman:

This leter is in response to four questions raised in Ref. 2 regarding the work reported in Ref. 1. The answers regarding the questions raised in Ref. 2 are:

(1) Spectra at the following nodes are used to calculate the fourth floor spectra:

(a) Section 1 (page 91 of Ref. 1) 366; 369; 373; 377; 380; 383.

(b) Section 2 (page 92 of Ref. 1) 386; 389; 392; 395; 398.

(c) Section 3 (page 93 of Ref. 1) 401; 404; 407; 410.

(d) Section 4 (page 94 of Ref. 1) 319; 322; 326; 330.

(e) Section 5 (page 95 of Ref. 1) 334; 335; 338; 342; 348; 354; 359; 363.

(2) The spectra for fan cooler locations four and five show a significant peak around 10-15 cps while the other three locations have no such peak. The peak at fan cooler location five is due to the response of node 342 which is a concrete slab node. The peak at location 4 is due to the response at node 330 which is in the steel framing. The question was raised as to why node 342 was the only one of the concrete nodes exhibiting such a peak.

An investigation of the mode shapes indicate that the 342 peak is due to mode 8 (see page 35 of Ref. 1). This mode is associated with an axial extension of the columns attached to nodes 344 and 337. If the mass acting in the concrete slabs is assumed to be uniformly distributed over the slab the modes associated with column extension can be shown to have a frequency of about 20-25 cps. A more detailed review of the nodal masses show that node 342 has an attached equipment mass of 104.8 lb sec^2/inch while the largest mass associated with the fourth section of the slab is 81.8 lb sec^2/inch. In addition, the column at node 318 is only 406.8 inches long, while all of the columns around fan cooler five are 592.8 inches long. Both of these factors will tend to reduce the frequency of the column mode around fan cooler location five. This is probably the reason that the spectral peak at this location occurs around 13 cps. The other concrete locations would be expected to have peaks closer to 20-25 cps.

In closing the discussions dealing with this item, it is worthwhile to mention that this particular behavior of the fourth floor was pointed out in the NUREG in a brief discussion dealing with the modes (see Ref. 1, page 27, end of second paragraph).

The response to the questions raised in Ref. 3 require code modifications so that modal masses and participation factors may be obtained as output and modification of the model so that the elevation 140 slab may be pinned at the cranewall. The results will be made available to you as soon as the work is completed.

Sincerely yours,

Morris Reich, Head
Structural Analysis Division

MR/dv