FLOOR RESPONSE SPECTRA FROM 1979 MONTICELLO
RESERVOIR EVENT VS ORIGINAL SSE FLOOR SPECTRA

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The October 16, 1979 RIS event recorded at the SMA station at the dam abutment was used to drive the Gilbert (GAI) model of the reactor building. The 90° component (which is slightly greater than the orthogonal) was used: first the raw data exactly as recorded at the concrete pad on soil, and then the corrected data as described below.

Ratios of peak and other floor response spectral values at frequencies of interest were then compared to the values at corresponding frequencies in the GAI floor response spectra used in design.

Two (2) nodal points were treated in this study: Node No. 1 at the top of the containment shell at elevation 532'11", and Node No. 10 near the top of the interior concrete structure at elevation 462'0".

These two points were selected because they are high and their response amplified, and because the GAI floor spectrum were available for comparison. The OBE spectral values and the FSAR figures were multiplied by 1.5 to obtain SSE values (in the ratio of 0.15g/0.10g for SSE/OBE on rock). We assumed the ground springs as rigid for this analysis.

## 1979 Record

As has been described elsewhere, we do not consider the SMA site near the dam abutment as a valid one to represent the driving conditions of large plant structures. The explosion test clearly showed greater motion at the SMA site than at the foundation of the auxiliary building. The ratio of the auxiliary building instrument response to the dam abutment instrument response provides for each frequency a transfer function to convert the SMA motion to foundation motion. However, as requested we have used both the raw SMA record and the converted record for this study. The raw record results are presented below, but are not considered applicable.

Figure 25 of the Field Test Report (Somerville Testimony) shows the transfer functions. In one case herein we use the envelope of both the N-S and the E-W curves, and in a second case we use the average of the two components.

## Results

For each node point, the peak floor response spectrum value occuring in any run are presented, all for 2% damping, as well as the floor spectra value of interest, especially in the high frequency range. Table 17-1 shows ratios of the 1979 record data to the original SSE floor response data 2% damped. The denominator in each case is from the GAI curves in the FSAR (multiplied by 1.5 to convert to SSE) and the numerator from the use of the 1979 record.

Figure 17-1 shows for Node 10 (elevation 462') of the interior concrete structure, four (4) damping-value floor response spectra derived from the 1979 90° record, corrected with the envelope of the transfer function from the explosive tests. It also shows the GAI SSE curve for 2% damping. At all frequencies, the SSE curve is above, or only trivially below the corresponding 2% curve based on the corrected 1979 event.

## Discussion of Results

Table 17-1 shows that at the top of the exterior concrete shell, the 1979 event with the field test transfer function applied is far from having its floor response spectra exceeded; i.e., the Monticello Resevoir event is not critical. The raw time history would cause some exceedances at certain frequencies, but this concept is not an acceptable one by any standard.

Likewise, for the interior concrete structure, the raw record is not acceptable. The adjusted record, even with the conservative enveloping transfer functions, does not cause any exceedances in the floor response spectra shown.

In summary, the 1979 RIS event when properly adjusted with spectra from the field test data, do not fault the floor response spectra compared herein and work in the design of the plant. There is no reason not to expect similar or more conservative (greater margin) results for other nodal points in the structural model.

TABLE 17-1

Ratio of 1979 Earthquake 2% Floor Response Spectral Accelerations to SSE Floor Response Spectral Accelerations (NOTE: The frequencies shown below include the highest peaks)

| Elevation (ft) | Frequency (Hz) | Ratio of Raw 79 EQ Peaks to SSE Peaks | Ratio of 79 EQ Converted Peaks to SSE Peaks Envelope TF* | Average TF** |
|---|---|---|---|---|
| 582' 11" | 5 | .98/7.8 = 0.13 | .30/7.8 = 0.038 | - |
| | 12-13 | 1.05/.7 = 1.50 | .26/.7 = 0.37 | - |
| | 20 | .65/.9 = 0.72 | .215/.9 = 0.24 | - |
| | 33 | .62/.5 = 1.24 | .29/.5 = 0.58 | - |
| 462' | 5 | .22/.6 = 0.37 | .05/.6 = 0.083 | - |
| | 12-13 | 7.65/6.0 = 1.27 | 1.91/6.0 = 0.32 | - |
| | 20 | 2.2/.9 = 2.44 | .65/.9 = 0.72 | - |
| | 33 | 2.18/.75 = 2.91 | .75/.75 = 1.00 | - |

* TF = Transfer function from Explosion Test No. 1 - Auxiliary Building response over SMA site response (from Figure 25 of Field Test Report)

** TF = Transfer function averages - Data not yet generated; however, it would be less conservative than using enveloping TF.

FIGURE DII-1

FLOOR SPECTRA AT ELEVATION 462'-0" FOR INTERIOR OF REACTOR BUILDING: CORRECTED 90° HORIZONTAL COMPONENT OF 10/16/79 RIS EVENT - VS - 2% SSE DESIGN SPECTRA ENVELOPE