

THE TEXAS A&M UNIVERSITY SYSTEM

TEXAS TRANSPORTATION INSTITUTE

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TRANSPORT OPERATIONS PROGRAM

50-275

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November 24, 1981

Mrs. Mitzie Solberg
Project Officer
Emergency Preparedness Branch
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

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Dear Mitzie:

The following is my review of "Earthquake Planning at Diablo Canyon" dated September 2, 1981. The report was prepared by the Tera Corporation for Pacific Gas and Electric.

It should be stated at the outset that there is no existing guidance for the preparation of evacuation time estimates for an earthquake scenario. It must also be stated that I am NOT reviewing the merits of the earthquake analysis relative to its magnitude nor its effects on the physical components of roadway systems (i.e. collapse of bridges, failure of embankments, landslides blocking roadways, etc.).

The primary conclusion to be drawn from the analysis is that the estimates are highly dependent on a series of assumptions. The analysis starts with an assumed earthquake and an estimate of its effects. Bridge failures range from 0 to 68 percent of the 90 bridges evaluated. Since no standard technique exists for evaluating vulnerability (see page 3-2 of the report), the analysis requires the use of engineering judgement (see page 3-38).

Thousands of feet of roadway are subject to landslides (see pp. 3-26 and 3-27) and liquefaction (see pp. 3-30 and 3-31). Again, engineering judgement (see pp. 3-17 and 3-21) played an important part in the damage estimates.

Given the estimated damage, additional estimates were made of the time required to clear roadways or repair the damage. The estimates used to prepare Table 4-2 assumed crews were available in relatively large numbers and do not appear to account for any mobilization time. The study estimates that evacuation times could increase up to about 8 hours with reduced crews (6 bridge and 20 road crews rather than 10 bridge and 70 road crews).

In summary, the estimate of evacuation times for the 10 mile EPZ ranges from 6 hours with no damage to 17 hours with heavy damage assuming a series of assumptions are met. Additional assumptions are also plausible and would further increase estimates. Equipment mobilization time could be significant due

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Mrs. Mitzie Solberg
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to the need to transport heavy equipment or possibly drive it under its own power at a slow rate of speed. It is also likely that a capacity reduction would be experienced similar to that observed in construction zones. This might be as much as one-third which would increase the time further.

The conclusion to be drawn is that a wide range of evacuation times might be experienced. The estimate for an earthquake scenario is subject to considerable variation beyond that shown in Table 4-2. The earthquake scenario is also not typical of adverse conditions that would typically be considered in evacuation time estimate analyses.

Sincerely,



Thomas Urbanik
Assistant Research Engineer

TU:jem

cc Pam Cummings
Battelle PNL
P. O. Box 999
Richland, WA 99352

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