MAY 2 2 1975

Karl Goller, Assistant Director
for Operating Reactors

REVIEW OF LIQUEFACTION ANALYSIS

PLANT NAME: Humboldt 3
LICENSING STAGE: OL
DOCKET NUMBER: 50-133

Since transmittal on November 19, 1974, of our review of the liquefaction potential of the soils underlying Humboldt Unit 3, we have performed a parametric study of the pertinent variables and recommend that a meeting to discuss the enclosed agenda be arranged at an early date. Following this meeting, we will recommend further actions as appropriate.

Harold R. Denton, Assistant Director
for Site Safety
Division of Technical Review
Office of Nuclear Reactor Regulation

Enclosure:
As stated

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Karl Goller, Assistant Director
for Operating Reactors

REVIEW OF LIQUEFACTION ANALYSIS

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Reference is made to my memorandum to you dated November 19, 1974, subject as above. Please arrange for a meeting between our staff and the applicant to discuss his liquefaction analysis at as early a date as is reasonable. Enclosed is a proposed agenda for the meeting.

Harold R. Denton, Assistant Director
for Site Safety
Division of Technical Review
Office of Nuclear Reactor Regulation

Enclosure:
As stated

cc w/encl:
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AGENDA
FOR
DISCUSSION REGARDING LIQUEFACTION
POTENTIAL AT THE HUMBOLDT BAY
NUCLEAR POWER PLANT SITE

1. The rate of earthquake activity on the San Andreas fault indicates that a magnitude 8: quake has a high expectation of occurring on that zone during the operating life of the plant. We have determined, using the method described by Hofmann (1974), that such an earthquake would cause a peak acceleration of 0.25g at the Humbolt site with a strong motion duration of about 50 cycles above 0.1g. This assumes that the San Andreas fault terminates at Cape Mendocino. Somewhat longer durations result if the fault is assumed to continue to the NW or to merge with the Mendocino escarpment. Reid 1910, indicates observed Intensities of VIII (equivalent MM) which correlates with a mean acceleration of about .3g. Several examples of soil failure in the vicinity of the plant site suggest liquifaction occurred during the 1906 San Francisco Earthquake (Pages 165-167 Reid 1910). Provide a careful quantitative analysis to determine the peak acceleration and the duration of motion above 0.1g at the Humbolt site that would be produced from magnitude 8.3 earthquake on the northern extent of the San Andreas fault.

2. Discuss the effect of 30 significant stress cycles on the liquefaction potential (Factor of Safety) at the Humboldt Site.

3. Discuss the effect of the C_r correction factor (based on relative density) to be applied to laboratory triaxial test data to obtain stress conditions in the field on the liquefaction potential at the Humboldt Site.

4. Discuss the cumulative effect of the above conditions on the liquefaction potential at the Site.

5. Discuss the initial liquefaction potential for the site based on the above conditions.

6. It is normal to multiply the stress ratio causing liquefaction in cyclic triaxial tests by a factor C_r. Your report states that no correction to triaxial test results is needed based on geological evidence and reports by Ladd and Foott (1973), Brooker and Ireland (1965), and Seed and Peacock (1971). Discuss the methods used to incorporate this evidence in your evaluation.

   Discuss other documented cases which used these methods to evaluate liquefaction potential.

7. Discuss the effect of initial liquefaction, 10 percent peak-to-peak strain and 20 percent peak-to-peak strain on all Category I foundations and facilities. Conservatively assess the hazards associated with movements and settlements of such foundations during and after the OBE and SSE.

8. Discuss foundation improvement to resist the seismic effects.