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ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

AUG 3 0 1974

DOCKET NO.: 50-219

LICENSEE : JERSEY CENTRAL POWER AND LIGHT COMPANY

FACILITY : OYSTER CREEK

SUMMARY OF MEETING HELD ON AUGUST 15, 1974 TO DISCUSS LIQUEFACTION ASPECTS OF SITE

On August 15, 1974, at Bethesda, members of the staff met with representatives of Jersey Central Power & Light Company (JCP&L) to discuss liquefaction aspects of the Oyster Creek Site in the area of the site proposed for the liquid - solid radwaste building. Attached are copies of the proposed agenda and a list of attendees.

Discussion

Dr. Harry Ham described the site and the foundation in the vicinity of the proposed radwaste plant. A few feet of granular fill is underlain by Cape May Sand, an upper clay layer which is overconsolidated with about one-third of its volume composed of sand lenses, an Upper Cohansey Foundation of low density sands, a Lower Cohansey Foundation of higher density sands, a lower clay layer which is also overconsolidated and contains sand lenses, and, finally, the Kirkwood Foundation.

Earlier reactions have been founded on the denser Lower Cohansey Foundation. The presentation by Dr. Ham explained the approach and analyses which have been used to support their plan to locate the foundation on or in the Cape May Sand (just below the granular fill).

The design earthquake used in the analysis has a peak acceleration of 0.22g as estimated by Housner in 1963 for an MM7 intensity earthquake. The equivalent number of cyclic stresses caused by this earthquake was taken as five. Cyclic tests were conducted on undisturbed and remolded soil specimens.

The Staff's reaction to the presentation may be summarized as follows:

(1) The duration and number of equivalent cycles assumed for the earthquake may be too short and too few when compared to the earthquake motions required by regulatory guides.

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(2) The site investigation and the number of soil samples tested is on the light side. In-situ densities are needed and are easily attainable at the site.

(3) Liquefaction safety factors based on 20 percent specimen strain are not appropriate. The licensee should use the initial liquefaction Safety Factor.

(4) The safety of the proposed foundation design depends mainly on the earthquake motions (time history) assigned to the site.

John Riesland

John Riesland
Operating Reactors Branch #3
Directorate of Licensing

Enclosure:
1. List of Attendees
2. Agenda

LIST OF ATTENDEES

AUGUST 15, 1974

OYSTER CREEK RADWASTE

John Riesland (Part time)	AEC,L
C. R. Montgomery	GPUSC
L. W. Heller	AEC,L
W. P. Gammill	AEC,L
H. M. Horn	Woodard-Moorhouse & Assocs., Inc.
Yves Lacroisc	Woodard-Moorhouse & Assocs., Inc.
David Jaffe (Part time)	AEC,L
Steve Chow	Woodard-Moorhouse & Assocs., Inc.
Joe Bennett	AEC,L

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VBenaroya

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WGammill
JKastner
MSpangler
RBallard
TJCarter
SVarga
PErickson
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ACRS (16)

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Proposed Agenda

Meeting on August 15, 1974 with AEC Staff

To Discuss Liquefaction Aspects of Site of

Proposed Liquid-Solid Radwaste Building

Oyster Creek Nuclear Power Station

1. Existing and Proposed Facilities

   Plan of Site and Locations of Borings

2. Generalized Subsurface Conditions

   a) Generalized Soil Profile

   b) Profile of Standard Penetration Resistance in Cohansey Deposit

   c) Detailed Stratigraphy of Upper Clay Layer

3. Seismic Parameters (for SSE)

   a) Obtained from Forked River NSP PSAR, 1, p. 2-44

$$a_{max} = 0.22g$$

$$I = \text{MM VII}$$

   b) Magnitude

   c) Equivalent number of significant cycles (Neq)

4. Concept of Factor of Safety in Terms of Strain Criteria

   a) Definition

   b) Strain criteria

      i. initial liquefaction

      ii. 20% double-amplitude (±10% average strain)

5. Methodology for Evaluation of Liquefaction Potential

   a) Identification of deepest soil layer that might have potential to liquefy

   b) Evaluation of factors of safety against initial liquefaction and the accumulation of various strain levels

   c) Comparison of computed factors of safety with acceptable values

6. Determination of Field Cyclic Shear Strength (S_c) for Selected Deformation Criterion

   a) Correlation between S_c and laboratory cyclic triaxial test value at corresponding deformation criterion

   b) Determination of laboratory triaxial cyclic stress-strain relationships

      i. undisturbed specimens

      ii. stress-controlled, cyclic $\overline{CIU}$ triaxial tests

      iii. relating laboratory cyclic stress ratio $(\sigma_d/2\bar{\sigma}_c)_{tx}$ to number of cycles required to reach specified deformation criterion

      iv. influence of confining stress ($\bar{\sigma}_c$) on laboratory cyclic triaxial test results

7. Determination of Earthquake Induced Cyclic Shear Stress (τ_i) - Simplified Procedure

a) Rigid body

$$\tau_{i(RB)} = \sigma_v \cdot \frac{a_{max}}{g} \cdot R$$

b) Deformable body

$$\tau_{i(DB)} = \tau_{i(RB)} \cdot r_d$$

8. Liquefaction Potential of Cohansey Deposit

a) Below el -28 ft

i. existing reactor founded at that level

ii. marked increase in denseness below that level

b) Above el -28 ft

Calculated factors of safety against initial liquefaction, and an accumulation of strain of 20% double-amplitude.

9. Liquefaction Potential of Upper Clay Layer