NSIC

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

November 26, 1979

Docket No. 50-409

Licensee: Dairyland Power Cooperative

Facility: La Crosse Boiling Water Reactors (LACBWR)

Subject: Summary of November 2, 1979 Meeting Regarding Liquefaction Potential at LACBWR (SEP Topic II-4)

On November 2, 1979, the NRC staff and their consultants met with Dairyland Power Cooperative (DPC) and their consultants in Bethesda, Maryland. A list of meeting attendees is attached. The meeting was a follow-up meeting to our October 17, 1979 meeting on the same subject (see meeting summary dated October 29, 1979). The purpose of the meeting was to allow DPC and their consultants to respond to the staff concerns identified in our October 17 meeting.

A summary of the important points follows:

1. DPC stated that they wanted to cooperate with NRC to resolve this issue. Their consultant, Dames and Moore, briefly summarized the liquefaction studies that have been performed at LACBWR. The results of the latest study are contained in a report entitled "Liquefaction Potential at La Crosse Boiling Water Reactor (LACBWR) Site" dated September 28, 1979. This study was undertaken at the NRC's request to supplement the data base obtained in previous work, using state-of-the-art techniques.

2. Using the results of laboratory triaxial tests, this study concludes that the minimum factor of safety against liquefaction for a 0.12g SSE is 1.50. Lower factors of safety were computed using an empirical treatment of Standard Penetration Test (SPT) data.

3. Dames and Moore indicated that they had more confidence in the results obtained from laboratory testing than in those derived from SPT data; and thus, gave little weight to the SPT results.

4. The NRC staff has independently compared the SPT data with that at Niigata, Japan, and obtain factors of safety less than 1. In addition, the staff and its consultant, the U. S. Army Engineer Waterways Experiment Station (WES), believe that the soil samples used for laboratory testing were densified 3 to 4 lbs/cu ft from the in-situ condition. This densification is due to the sampling process itself and in the later consolidation of the samples for lab testing. WES asserted that the increased density was not adequately accounted for in Dames and Moore's analysis; and when properly accounted for, would substantially reduce the factors of safety against liquefaction.

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5. Dames and Moore acknowledged that increases in soil sample density would decrease computed factors of safety, but stated that they believed a more realistic estimate of the density increase was 2 lbs/cu ft. According to their rough calculations, such a density increase would yield a minimum factor of safety of 1.2 instead of the 1.50 given in their report.

6. The NRC staff and WES disagreed with Dames and Moore's judgement that 2 lbs/cu ft was an appropriate density increase to assume. They cited past experience with this type of sampling, and the data in the Dames and Moore report, to support their contention that the probable increase in density was 3 to 4 lbs/cu ft. With this increase, and their analysis of the SPT data, the staff concluded that if sustained strong ground motion with peak accelerations of 0.12g or higher occurs, liquefaction can occur at the LACBWR site.

7. The NRC staff has concluded based on its evaluations to date that there is a relatively low seismic hazard at this site because of the earthquake history and initial estimates of the long return periods in this region for the size event that would have to occur to generate a .12g. The staff indicated that it was proceeding with its evaluation of the SEP seismic methodology and the establishment of the seismic design basis for La Crosse. It will take approximately three months to complete this evaluation. The NRC staff concluded that operation during this limited period will not pose a hazard to the public health and safety from potential liquefaction at the site. In the interim, DPC agreed to consider modifying the site soils to preclude liquefaction.

8. DPC agreed to submit a detailed plan for precluding liquefaction to the NRC by November 30, 1979. The approach they will use may involve a dewatering system, but they could use other methods depending upon costs and ease of implementation.

Jack S. Wetmore, SEPM
Operating Reactors Branch #2
Division of Operating Reactors

Attachment:
List of Attendees

cc w/attachment:
See next page

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cc w/attachment:
Fritz Schubert, Esquire
Staff Attorney
Dairyland Power Cooperative
2615 East Avenue South
La Crosse, Wisconsin 54601

O. S. Heistand, Jr., Esquire
Morgan, Lewis & Bockius
1800 M Street, N. W.
Washington, D. C. 20036

Mr. R. E. Shimshak
La Crosse Boiling Water Reactor
Dairyland Power Cooperative
P. O. Box 135
Genoa, Wisconsin 54632

Coulee Region Energy Coalition
ATTN: George R. Nygaard
P. O. Box 1583
La Crosse, Wisconsin 54601

Charles Bechhoefer, Esq., Chairman
Atomic Safety and Licensing Board
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dr. George C. Anderson
Department of Oceanography
University of Washington
Seattle, Washington 98195

Mr. Ralph S. Decker
Route 4, Box 190D
Cambridge, Maryland 21613

La Crosse Public Library
800 Main Street
La Crosse, Wisconsin 54601

Mr. Frank Linder
General Manager
Dairyland Power Cooperative
2615 East Avenue South
La Crosse, Wisconsin 54601

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LIST OF ATTENDEES

NOVEMBER 2, 1979

LIQUEFACTION POTENTIAL AT LACBWR

DPC

E. Trammel
J. Parkyn

Dames and Moore

M. Nataraja
H. Singh
R. Fox

NRC

J. Wetmore
C. Hofmayer
J. Greeves
L. Heller
J. Shea
C. Woodhead
D. Crutchfield
P. DiBenedetto
T. Cheng
P. Sobel
J. Harbour
L. Reiter
H. Levin
H. Lee
R. Jackson

WES

W. Marcuson

NES

R. Milos
I. Husain

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