



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

APRIL 2 1979

Docket No. 50-334

LICENSEE: Duquesne Light Company

FACILITY: Beaver Valley Power Station, Unit No. 1

SUBJECT: MEETING SUMMARY - CATEGORY I SOILS STUDY

The NRC staff met with the licensee and its architect engineer for Beaver Valley Power Station Unit No. 1, (BVPS-1) the Stone and Webster (S&W) Company, on January 26, 1979 to discuss the soils study and site liquefaction at BVPS-1, (see Attachment 1 for list of attendees).

BACKGROUND

In early December, 1978, the Geosciences Branch of the Division of Site Safety and Environmental Analysis performed a review of the BVPS-1 soils study, Supplement No. 2 (May 1, 1978). The soil study is further documented as follows:

1. Summary of Meeting with Duquesne Light Company on November 15, 1977, to discuss the Soil Study Program at Beaver Valley Power Station - Unit No. 1 (issued 12/22/77);
2. Soils Study-Category I Structures (Response to NRC letter of 11/17/76) Beaver Valley Power Station - Unit No. 1. Duquesne Light Company, DLC letter dated February 14, 1977;
3. Supplement to Soil Study-Category I Structures (Response to NRC Meeting of 11/15/77) Beaver Valley Power Station - Unit No. 1. Shippingport, PA., DLC letter dated January 13, 1978;
4. Supplement No. 2 to Soil Study-Category I Structures (Response to NRC Meeting on 11/15/77), Beaver Valley Power Station - Unit No. 1, Shippingport, PA, DLC letter dated May 1, 1978.

A review of the above information was also performed by Dr. F. E. Richart, consultant to Advisory Committee on Reactor Safeguards, and his findings confirmed those of the licensee and staff that, subject to clarifying some details of soils testing program, the safety factors against the potential for liquefaction are adequate.

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PDR

The calculations and analyses were performed on the soils and areas beneath seismic Category 1 structures which house safety related equipment and systems. Dr. Richart's findings were presented in his letter to the ACRS dated July 15, 1978.

In the staff's December 1978 review, the liquefaction potential immediately adjacent to the Category 1 structures was investigated to determine the potential for liquefaction and loss of stability in adjoining areas which might affect Category 1 structures. Preliminary staff calculations during this review indicated a liquefaction potential beneath the turbine building and in plant area just riverward of the turbine building. These calculations were based on the 25 year flood (690 mean sea level), the Safe Shutdown Earthquake (SSE), lower confining pressures in this area due to reduced overburden loading, and laboratory soils data developed in March and April 1978 on samples recovered in the foundation of the BVPS Unit No. 2. Our preliminary calculations also showed that the safety factor against liquefaction was dependent upon water level. Allowing for a margin of safety against liquefaction of 1.1 on a temporary basis and accepting an SSE ground acceleration of 0.125g, we calculated the water level in the turbine building area could rise to elevation 676. The licensee was advised of these calculations on December 21, 1978.

By NRC letter on January 9, 1979 the licensee was requested to provide additional information and details of the completed soils testing program, as identified earlier by Dr. Richart and the staff review comments, and to conduct a liquefaction analysis of the affected areas. A meeting date of January 23 or 24 was established to discuss the results of the requested liquefaction analysis and the need for a stability analysis.

MEETING SUMMARY

Duquesne Light Company's Consultant, Stone & Webster Engineering Corporation (S&W), presented responses to information requests 362.1, 362.2 and 362.3 (see attachment 2). These requests were forwarded by our letter of January 9, 1979, Duquesne Light Company. The stability analysis of request 362.4 was underway; the results were to be forwarded to the NRC.

A copy of a Stone and Webster interoffice memorandum dated January 24, 1979, which was provided, contained the results of a study defining the stage and duration of flood events from 1972 to the present at the Beaver Valley site (see attachment 3). These data show that, although the river occasionally has had high levels, the time the level has been above 675 feet has been relatively short, on the order of 24 to 48 hours in most cases.

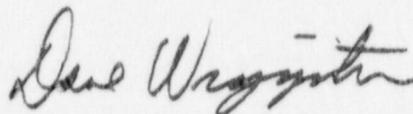
There was considerable discussion on the methods and basis being used to compute cyclic shear stresses induced by the design earthquake. Stone and Webster has essentially use Fig. 2.6-7 from Volume 1 of the FSAR for Unit 1 which has a peak ground acceleration of 0.10g. The NRC staff used the maximum ground surface acceleration of 0.125g, established for the Safe Shutdown Earthquake (SSE), as input to the Seed and Idriss analytical method and adopted an average value for r_d (a stress reduction factor that allows for the deformable nature of the soil). For foundation conditions near the turbine building, the difference between the 0.125g and 0.10g acceleration levels is significant on the results of the liquefaction analysis. Duquesne Light Company representative requested that NRC accept their basis and method and recommended design acceleration level of 0.10g, at least on an interim basis, until current foundation evaluation studies are completed. There was no agreement reached on this issue at this meeting and this difference was to be further discussed with the NRC reviewing seismologist at the Bethesda office.

There was agreement between Duquesne Light Company and the NRC staff that, for an SSE (0.125g) an acceptable margin of safety against liquefaction in the turbine building area would not be available under the water level predicted for 25-year flood. This conclusion is based on considering both the records of completed borings for Unit 1 and on completed cyclic triaxial laboratory test data. There was also agreement that both settlement and lateral displacement of foundation soils caused by dynamic loading must be addressed.

Conceptual approaches for improving the foundation stability of the turbine building area were briefly discussed and included schemes of permanent dewatering and grouting, (either chemical or combination of chemical-cement grout).

Duquesne Light Company, DLC, plans to drill additional borings in the plant area just north of the turbine building beginning the week of February 5, 1979. These borings were originally intended for the foundation investigation of the proposed Condensate Polishing Building. The original boring program will be modified to investigate the loose granular zone which has been indicated in completed borings 108 and 109. Discussions were held on the importance of good sampling procedures and addressing the impact of gravel particles on the recorded Standard Penetration Test. The DLC onsite quality assurance group will closely monitor the borings to assure quality of the results. Tentative arrangements were established to have a Region I inspector visit the site and monitor the QA activities during the time of actual drilling. Expansion of the exploration program to include borings in the actual turbine building foundation is a possibility depending on the significance of findings in the initial borings.

Based on the S&W calculations and the review by the Offsite Review Committee for the BVPS Unit No. 1, DLC imposed an administrative control on the operation of the reactor that should the river level exceed 680 feet mean sea level as measured at the main water intake structure, the reactor would be shutdown, (see attachment 4). The IE inspector verified that this administrative control was already operational and the shift operators were being made aware of this change.



Dave Wigginton, Project Manager
Operating Reactors Branch #1
Division of Operating Reactors

Attachments:

1. List of Attendees
2. Duquesne Light Company January 25, 1979, responses to requests for additional information 362.1, 362.2, and 362.3 made by NRC letter dated January 9, 1979.
3. Stone and Webster Interoffice Memorandum from N. B. Lemieux to D. S. Campbell, subject "Recent Flood History Beaver Valley Power Station" dated January 24, 1979.
4. Administrative Control 3/4 7.6 Flood Protection, imposed January 26, 1979 and signed by J. A. Erling, Station Superintendent.

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Meeting Summary for
Matters Relating to March 13, 1979 - 3 -
Show Cause Orders

Docket Files

NRC PDR

Local PDR

ORB Rdg

NRR Rdg

C. Kammerer

J. Fouchard

H. Denton

E. Case

V. Stello

R. Mattson

R. Boyd

R. DeYoung

D. Eisenhut

R. Vollmer

R. Denise

J. P. Knight

A. Schwencer

D. Ziemann

T. Ippolito

R. Reid

P. Check

G. Lainas

D. Davis

B. Grimes

V. Noonan

F. Shauer

R. Bosnak

L. Heller

K. Eichman

D. Brinkman

C. Nelson

D. Neighbors

P. Polk

D. Wigginton

OELD

J. Scinto

J. Souder (LPDR - advance copy)

I&E (3)

M. W. Peranick, I&E

CSD (3)

C. Showe, I&E

E. Jordan, I&E

E. Farnish

A. Inchar

C. Sheppard

E. Kreutzer

A. Fraley, ACSC (3)

Receptionist - for meetings held in Bethesda

Program Support Branch P-428
Principal Staff Participants

LIST OF ATTENDEES

Nuri T. Georges	Stone & Webster
W. F. Swiger	Stone & Webster
J. J. Moran	Stone & Webster Licensing
J. Bajuszik	DLC
R. J. McAllister	DLC
W. G. Logan	DLC
D. A. Beckman	USNRC IE/Reg. I
J. J. Carey	DLC
D. L. Wigginton ✓	USNRC
D. S. Campbell	Stone & Webster
J. D. Kane	NRC, Geotech. Engr.
A. A. Varela	NRC, IE/Reg. I
K. S. Herring	USNRC/DOR/EB