DAIRYLAND POWER COOPERATIVE · P.O. BOX 817 · 2615 EAST AV SOUTH · LA CROSSE WISCONSIN 54601
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September 9, 1980

In reply, please refer to LAC-7131

DOCKET NO. 50-409

Director of Nuclear Reactor Regulation
ATTN: Mr. Dennis M. Crutchfield, Chief
Operating Reactors Branch No. 5
Division of Operating Reactors
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

SUBJECT: DAIRYLAND POWER COOPERATIVE
LA CROSSE BOILING WATER REACTOR (LACBWR)
PROVISIONAL OPERATING LICENSE NO. DPR-45
RESPONSE TO QUESTIONS RELATIVE TO VOIDS
UNDER TURBINE BUILDING MAT

Reference: (1) NRC Letter, Crutchfield to Linder, dated July 28, 1980.
(2) DPC Letter, Linder to Crutchfield, LAC-7100, dated August 25, 1980.

Gentlemen:

In response to questions forwarded with Reference 1, we are submitting as Enclosure 1, answers to the subject questions. The answers provide details related to the presence of voids underneath the Turbine Building mat.

Our letter, Reference 2, notified you of our intention to provide in the near future grouting in the areas of concern to alleviate any potential for reduction of Turbine Building integrity.

If further information is necessary, please contact us.

Very truly yours,

DAIRYLAND POWER COOPERATIVE

Frank Linder

Frank Linder, General Manager

FL:RES:af
Enclosure

cc: J. Keppler, Reg. Dir., NRC-DRO III
NRC Resident Inspectors

ENCLOSURE 1

1. Description of Geometry of Voids Under Turbine Building:

During the recent test boring program within the developed area of the LACBWR plant site, two borings, DM-12 and DM-13, indicated the existence of minor voids in the vicinity of the borings. The other two borings, namely DM-14 and DM-15, drilled on either side of the stack did not indicate any such voids under its pile cap. The discovery of two minor voids raised the question whether voids exist beneath the turbine floor in other areas. In order to study the lateral and vertical extent of the voids, an exploratory drilling program was undertaken. DPC personnel drilled a total of 13 holes through the concrete floor using a light portable core drill. The locations of these bore holes 1 through 13 along with the recent soil borings DM-12, 13, 14 and 15 are shown in Plate 1.

Table 1 shows details such as the diameter of the holes, depth of concrete cored, and the approximate measured depth of voids below the concrete floor. It can be seen that the void depth ranges between 0 to 10 inches. The data also indicates that the voids exist only within the turbine building area. Lateral definition of voids could not be obtained due to varying floor thicknesses and the existence of the concrete beams under the floor.

2. Voids Under Other Safety Related Structures:

In addition to the turbine building, the 1B Diesel Generator Building, which is also a safety related structure, was investigated for voids. Borehole number 8 in Table 1 indicates a void of about 1¼" under a 24-inch thick floor. Since the containment is seated* on natural material (unlike the turbine building which is seated* on hydraulic fill), we believe that no voids exist under the containment base. We do not believe any other safety related structures contain voids under their floors.

3. Significance of Voids Relative to the Integrity of the Mat Under Normal Operating and Seismic Loads:

The turbine building floor has been performing satisfactorily under normal operating conditions and no significant cracking or any other signs of

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* Only seated, not supported; support comes from piles driven into deeper compacted soil.

distress have been observed in the floor in any part of the building. With grouting (See Section 6) we believe that the floor will perform satisfactorily even in the unlikely event of seismic loads.

4. Significance of Voids Relative to the Integrity of Pile Foundation Under Dynamic Loads:

The voids found under the turbine building floor are confirmed to extend only to a few inches below the floor. Three of the outer walls of the turbine building are supported on reinforced concrete beams,* 66 inches deep and from 15¼ to 18 inches wide. The inner wall adjoining the containment building is anchored much deeper due to the construction of the vault for the underground equipment. These beams are supported by pile caps which range from 24 to 45 inches in depth. The turbine foundation pile cap is 48 inches deep. The turbine building floor is underlain with reinforced concrete beams ranging from 15 inches to 33 inches deep beneath an additional 6 inches of finished concrete and ranging from 24 to 72 inches in width. These concrete beams sit on pile caps which range from 24 inches to 45 inches in depth. Therefore, we believe that there is no pile under the turbine building with a lack of support in the lateral direction. The standard penetration test data obtained during the recent test boring program indicates that the firm lateral support available for piles from the surrounding dense sands is adequate to prevent any significant lateral displacement and no excessive shears or moments are expected to be produced as a result of seismic loads. Also, the proposed grouting (See Section 6) will restore the conditions that existed immediately after construction and will further improve the performance of piles under seismic loads.

5. Validity of Assumptions Made in FTOL Dynamic Analysis Relative to the Modeling of the Pile/Mat Foundation:

At the time FTOL dynamic analysis was performed, the assumption that the piles under the turbine building were entirely laterally supported was reasonable, as there was no evidence to assume otherwise. This assumption is still valid as explained under Section 4. However, the floor of the turbine building at the present time is not entirely supported on grade as determined by the discovery of voids. The proposed grouting (See Section 6) will provide continuous support for the floor.

*(from 60 to 66 inches)

6. Void Correction:

We believe that by grouting the voids under the turbine building floor, any potential problems under seismic conditions will be solved. We are currently studying the most effective procedures that can be used to accomplish the above goal of filling all the voids under the turbine building floor with a suitable grout. We will submit the details of our proposed grouting plan in the near future.

7. Justification for Continued Operation During the Evaluation and During the Period Required to Correct Any Problems:

We have provided detailed presentations related to the low seismicity at LACBWR plant site in our previous reports. Even when NRC served a Show Cause Order to Dairyland Power Cooperative in connection with the liquefaction issue, it was considered by NRC that continuation of plant operation until February 25, 1981 would not endanger the health and safety of the public. This consideration was based on probabilistic studies performed by NRC consultants which showed that the seismic hazard at LACBWR site was relatively low. Subsequent studies by Dames & Moore showed that the seismic hazard was even lower than that presented in the NRC studies. In view of the low seismicity at the LACBWR plant site and in view of the fact that DPC is already preparing for prompt corrective measures which are expected to be completed well before February 25, 1981, we believe that there is strong justification for uninterrupted plant operation.

TABLE 1

TURBINE BUILDING BORING DATA

Hole No.	Diameter In Inches	Depth of Concrete In Inches	Void Depth Below Concrete In Inches
1	1-3/4	16	2-1/2
2	1-3/4	16	6
3	1-3/4	16-3/4	1-3/4
4	1-3/4	15	2
5	1-3/4	28-3/4	<6-1/4*
6	1-3/4	16-1/2	2-1/2
7	1-3/4	18-1/2	4
8	2	24-1/4	1-1/4
9	1-3/4	15-1/4	8
10	2	15-1/4	1
11	2	16-1/2	2-1/4
12	2	14	3/4
13	2	19-1/2	<1/2**
DM-12***	5	16	7
DM-13***	5	20	10
DM-14***	5	48	0
DM-15***	5	48	0

* An accurate reading for this hole was not possible due to difficulty drilling through concrete. The final section of core had to be hammered out of the bit and was driven into the sand below the concrete.

** Surface of the sand was disturbed due to the water used for drilling the hole.

*** DM-12, 13, 14, and 15 were the four test borings drilled in July, 1980 as part of the liquefaction evaluation under the developed area of the LACBWR site.

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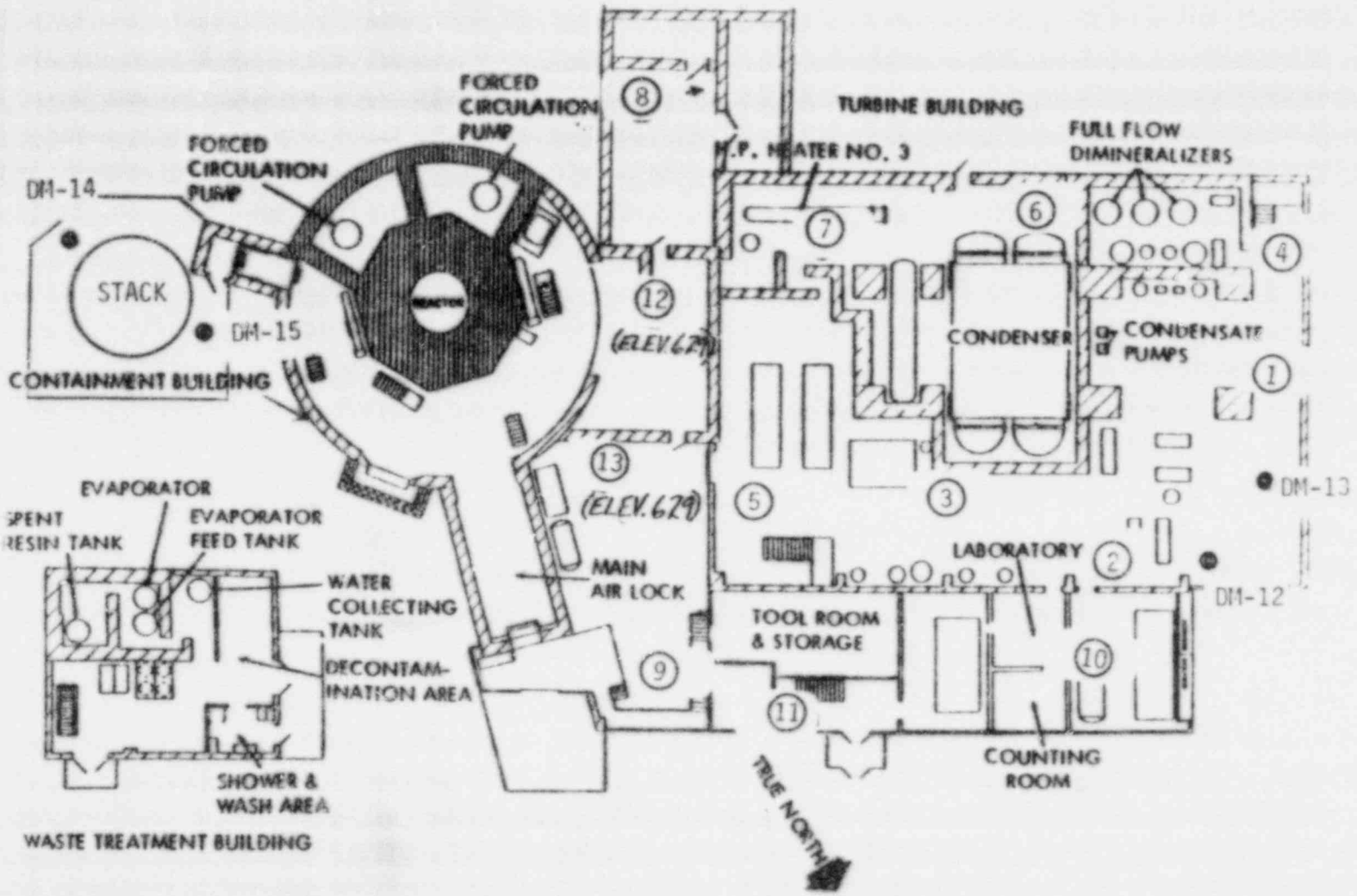

BORING LOCATIONS

GRADE FLOOR OF TURBINE BLDG., EL. 640' -0"

BROWN & MOORE ENGINEERS

PLATE 1