

October 22, 1982

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In reply, please  
refer to LAC-8665

DOCKET NO. 50-409

Director of Nuclear Reactor Regulation  
ATTN: Mr. Dennis M. Crutchfield, Chief  
Operating Reactors Branch #5  
Division of Licensing  
U. S. Nuclear Regulatory Commission  
Washington, D. C. 20555

SUBJECT: DAIRYLAND POWER COOPERATIVE  
LA CROSSE BOILING WATER REACTOR (LACBWR)  
SEP TOPIC III-3.A - EFFECT OF HIGH  
WATER LEVEL ON STRUCTURES, (REVISION 1)

- REFERENCES: (1) DPC Letter, LAC-8283, Linder to Crutchfield,  
dated May 12, 1982  
(2) Telex, R. Dudley (NRC) to D. L. Rybarik (DPC),  
dated July 26, 1982, "Staff questions (5)  
regarding SER III-3.A  
(3) Telecon, NRC Staff to DPC/Consultant, on  
September 28, 1982, Discussion of staff questions  
and required action  
(4) NRC Letter, LS05-82-07-071, Crutchfield to Linder,  
dated July 29, 1982, SEP Topic II-4.F, Final Evaluation

Gentlemen:

This letter summarizes the results of our review of the effects of a design basis flood (DBF) on the LACBWR Containment and Turbine Building structures utilizing the staff developed Probable Maximum Flood (PMF) of 658 feet MSL, with a superimposed concurrent 3 foot high wave, and flow of  $1.0 \times 10^6$  cfs as the site specific flood criteria. In addition, the staff specifically requested that the re-evaluation be performed without reliance on the use of any temporary protective structures as presented in SEP/SER's II-3.B and II-3.B.1 (Reference 1).

The analysis of the Turbine Building and reanalysis of the Reactor Containment using the above DBF criteria, was performed by a DPC consultant who developed specific velocity and flow direction in and around the LACBWR structures based on the DBF event. The velocities were determined by reviewing the river valley cross section at the plant site and calculating the anticipated velocities in various sections of the valley based on available flow areas and natural features for each area. The direction of flow within the site was selected by inspection. Verification of the staff wave height was conducted in accordance with the Standard Review Plan (SRP) 2.4.3, which resulted in a calculated significant wave height of 3.6 feet. This wave height (3.6 feet) with the associated set of waves and wind conditions was chosen to evaluate the LACBWR structures of concern.

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The evaluation of the Reactor Containment was performed using the Black & Veatch computer program S73, a finite element, shell of revolution program. The vessel was evaluated against the 1980 Edition of the ASME Code, Section III, Subsection MC, Paragraph NE-3000. The vessel was assumed to be pressurized to an internal pressure of 20 psig (see Reference 1 SER's II-3.B and II-3.B.1). The following load combination of:

$$D + H + W + P$$

Where D = Dead loads

H = Hydrostatic pressures due to water including effects of flow and wave

W = Wind conditions corresponding to a 3.6 foot significant wave height

P = Internal pressure of 20 psig

indicated that the vessel will remain in tension throughout the DBF conditions and that the primary stresses are significantly below the design levels corresponding to the vessel internal design pressure of 52 psig. Floation of the containment was addressed in the previous SER II-3.B submittal (Reference 1) and found satisfactory. Sliding and overturning of the vessel are resisted by the 30 feet of embedment of the containment vessel.

The Turbine Building is an unvented structure which will become flooded as the plant site becomes inundated. The analysis of the Turbine Building indicates that it can withstand the combined effects of the flood and the associated wave and wind conditions within the limits of ACI-311 and AISC. All available doors and windows are opened prior to the predicted flood to assure that the interior of the building will be flooded. The building was evaluated for both sliding and overturning. The factors of safety exceeded 1.1 for sliding and 1.5 for overturning. The factor of safety as required in SRP 3.8.5 for both conditions is 1.5 for the normal design wind conditions and 1.1 for tornadic wind conditions. The Turbine Building analysis for sliding is conservative because the horizontal resistance of the foundation system was determined using only the passive resistance of the soil. Other factors; such as, lateral resistance of the unreinforced piles, friction between the mat and soil, and the increased densification of the soil below the building due to a recent grouting program (Reference 4) were ignored due to uncertainties in soil parameters and strength of the unreinforced piles. Properly modeled any one or combination of these features would increase the factors of safety. Local failures of the exterior walls were not specifically analyzed and in our judgement do not affect the overall performance of the building.

In summary, the review indicates that the Containment and Turbine Buildings will withstand the DBF conditions postulated by the NRC staff. In addition, the analysis conservatively ignored the shielding influence of the other buildings situated upstream of both the Containment and the Turbine Buildings. Also, the analyses neglects any flood protection measures DPC would more than likely initiate at the Genoa site in order to protect the property investment.

It is also appropriate to reiterate that the staff's DBF criteria used to perform this evaluation indicates a discharge flow probability of considerably less than  $1 \times 10^{-4}$  using SER figure II-3.B.2 (Reference 1). Also, since we have not been requested to resubmit flooding SARs II-3.B, II-3.B.1 and

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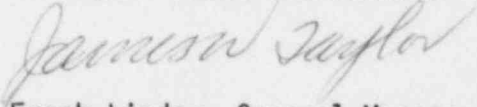
Hydrologic Description SAR II.3.A which are currently under staff review, we wish to alert the staff that those reviews should be conducted considering the results of this subsequent evaluation.

It is our understanding that this response satisfies the staff's need for additional flooding effects information and fulfills the questions (Reference 2) discussed during the telecon of September 28, 1982 (Reference 3).

If you have any questions regarding this submittal, please advise us.

Very truly yours,

DAIRYLAND POWER COOPERATIVE

  
for Frank Linder, General Manager

FL:DLR:eme

cc: J. G. Keppler, Regional Administrator, NRC-DRO III  
NRC Resident Inspector