Docket File

Docket No. 50-302

MAR 12 1973

POOR ORIGINAL

Florida Power Corporation
ATTN: Mr. J. T. Rodgers
Assistant Vice President &
Nuclear Project Manager
P. O. Box 14042
St. Petersburg, Florida 33733

Gentlemen:

On the basis of our continuing review of the Final Safety Analysis Report (FSAR) for Crystal River, Unit 3 Nuclear Generating Plant, we find that we need additional information to complete our evaluation. The specific information is listed in enclosures (1) and (2). Enclosure (1) details our position on hurricane protection based on available information and specifies additional information which we require to further evaluate the validity and applicability of the Bonne and Moore model to this application.

While the staff will objectively evaluate this additional information requested in enclosure (1), you are, of course, aware that this information may or may not provide a reasonable basis for significantly revising our present assessment. That assessment is that the plant should be designed to withstand a probable maximum hurricane (PMH) surge that produces a stillwater level of 33.4 feet mean low water (MLW) compared to your present estimate of 29.6 feet MLW.

As noted in your letter of February 22, 1973, the facility has been designed to withstand a PMH surge that produces a stillwater level of only 24.5 feet MLW. This is well below current estimates by both Florida Power Corporation and the staff. Therefore, in order to complete our evaluation of the design adequacy of the plant in this area, we will require the additional information requested in enclosure (2).

Because of the potentially significant effect of these items on our licensing review schedule, we will need a completely adequate response by May 11, 1973. Please inform us within seven days after receipt of this letter of your confirmation of the schedule or the date you will be able to meet. If you cannot meet our specified date or if your reply is not fully responsive to our requests it is highly likely that the overall schedule for completing the licensing review for this project will require completion of the new assignment prior to returning to this project, the extent of extension will most likely be greater than the extent of delay in your response.

Please contact us if you have any questions regarding the enclosed requests.

Sincerely,

Original Signed by
R. C. DeYoung

R. C. DeYoung, Assistant Director
for Pressurized Water Reactors
Directorate of Licensing

Enclosures:
(1) and (2) Requests for Additional Information

cc: S. A. Brandimore
Vice President &
General Counsel
P. O. Box 14042
St. Petersburg, Florida 33733

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ENCLOSURE (1)
REQUEST FOR ADDITIONAL INFORMATION
FLORIDA POWER CORPORATION
DOCKET NO. 50-302

You have requested an evaluation and approval of a hurricane surge model, which differs in certain significant aspects from that used by the staff in previous reviews. Your Amendment 23 response to previous questions on hurricane protection and the information provided at the February 15, 1973 meeting about your model is not sufficient to justify an approval of your model or a departure from the use of our model. We and our consultant believe that a stillwater level of 33.4 ft. MLW (compared to your estimate of 29.6 ft. MLW) should be adopted for the site, unless the information requested below relating to your model proves conclusively that it is at least as capable of reproducing historical hurricane surge hydrographs as our model. Our estimated level is based on HUR 7-97 storm parameters of a large radius to maximum winds of 24 nautical miles, high speed of translation (20 knots), and includes a two foot stillwater level reduction for overland flooding between the coastline and the plant. To consider your model further, we will require:

1) a complete mathematical and theoretical description of the model;

2) your basis for the selection of significant input parameters and a discussion of their degree of conservatism, including bottom stress coefficients, wind stress coefficients, and any other calibration coefficients;

3) a comprehensive verification of the model and its parameters by a comparison with the recorded surge hydrographs and peak water levels using recorded wind field and pressure data for at least the following storms:

   a) hurricane Carla (1961) surge hydrographs at Galveston and Freeport, Texas;

   b) the October 3, 1949 hurricane surge hydrographs at Galveston and Freeport, Texas;

   c) hurricane Ione (1955) at a location north of where the storm crossed the East Coast;

   d) Hurricane Cammille (1969) peak water level on the Gulf Coast;

4) an explanation and analysis of the principal differences between your maximum surge for Crystal River and the staff's estimate.

5) We disagree with the basic application of your model to the PMH surge level and, therefore, the coincident wind wave activity at the site. The following are the areas of disagreement, or areas for which insufficient information has been provided, and for which either a revised estimate or substantiation of your position should be provided.

a) The ambient tide conditions during which a PMH is assumed include both a high spring tide, and what is generally termed an initial rise. The initial rise is considered to be a sea level anomaly, and is estimated by comparing recorded and predicted tides. Based on several years of record at local Gulf Coast tide stations, an initial rise of 0.6 feet should be assumed for the site. This condition is not considered a function of meteorological factors which could cause a PMH, such as indicated on page 7 of your Appendix 2c, but rather to other causes as are generally observed in tide records. Provide a revised surge estimate including the above consideration.

b) Hurricane wind speed adjustments, when the storm is approaching closely to shore, are discussed in the memoranda HUR 7-97 (which was prepared by the Hydrometeorological Branch of the Weather Bureau - now National Oceanic and Atmospheric Administration) and your Appendix 2c. However, surface wind speed reductions at two miles offshore would produce more conservative surge estimates than would the selected three mile value and should be included in a revised surge estimate. If reference can be made, however, to documented evidence that wind speed reductions can be assumed further offshore, this less conservative assumption would be acceptable.

c) No water surface frictional estimates are presented. Based on the U.S. Army Coastal Engineering Research Center publication, Technical Memorandum 35, however, it has been found that surface friction should be assumed to vary with wind speed. Your assumptions should be presented, and if different than the referenced publication, they should be substantiated.

d) For each safety-related structure, system, and component identified necessary for plant protection (see Request 2.16), and based on both a stillwater level of 33.4 ft. MLW and your fully verified stillwater elevation estimate, provide tabulations of the height of the most significant (average of the highest one-third) and the maximum (1 percent) waves, or the breaking waves (whichever is the most severe) and the associated runup for each case.

e) Discuss the applicability of your hydraulic model studies for estimating runup on and over the soil-cement protected embankment and on interior facilities for both water levels and wave conditions discussed herein.

Enclosure (2)

REQUEST FOR ADDITIONAL INFORMATION
FLORIDA POWER CORPORATION
DOCKET NO. 50-302

2.0 SITE AND ENVIRONMENT

2.15 Section 2.4.2, modified by Amendment 23, indicates that the facility will be allowed to operate for hurricanes less severe than the probable maximum hurricane (PMH), but that the plant will be shutdown for more severe hurricanes up to and including the PMH. Provide the following information for events less severe than the PMH for which operation will be allowed in sufficient detail to allow an independent review to be made of the adequacy of your facilities and operating plans:

2.15.1 Describe the limiting, hurricane-induced conditions of water level, wave action, etc., and their bases, for which cold shutdown will be undertaken. Include assurances that sufficient time will be available to complete cold shutdown before hurricane levels become critical.

2.15.2 Provide a commitment to a technical specification for cold shutdown of the plant based on 2.15.1 above, and include a discussion of the emergency procedures that will be required to protect the safety-related structures, systems, and components required for maintenance of shutdown for hurricane conditions up to and including those caused by a PMH.

2.15.3 Identify those safety-related structures, systems, and components necessary for safe operation (see Safety Guide 29). Compare the conditions identified in Request 2.15.1 above with the design bases and general adequacy of each such facility to perform its required function, and indicate any action required to assure functionality for hurricane conditions up to those requiring shutdown.

2.16 For hurricane conditions more severe than those for which operation would be allowed, up to and including PMH conditions that both you and the staff have estimated, identify all those safety-related structures, systems, and components necessary to assure maintenance of shutdown conditions. Discuss the ability of each structure, system, and component to withstand both the static and dynamic consequences of hurricanes up to and including those of PMH severity for both stillwater level estimates.

2.16.1 Provide assurance that failures of Units 1 and 2, or any other non-safety structures, systems or components, in the event of severe hurricanes will not impair the functionality of safety related equipment required for safe shutdown of Unit 3.

2.17 Provide the minimum submergence levels for both circulating and service water pumps.

2.18 We understand that the soil-cement protected embankment is required to maintain the functionality of safety-related facilities during hurricane conditions. Substantiate its ability to withstand the static and dynamic consequences of water level and frontal wave action for both PMH estimates. Documentation may consist of reference to other coastal facilities which have experienced conditions similar to those postulated for the Crystal River site, to full scale hydraulic model studies, or to analytical studies of static and dynamic forces. Also discuss the ability of the protection and the embankment to withstand wave overtopping. If the embankment is not required for hurricane protection, provide your assumptions of its failure during such events and the consequences of failure on required safety-related facilities.

2.19 Provide substantiated assurance of the ability of safety-related structures, systems, and components necessary for safe operation, and those required for cold shutdown and maintenance thereof, to withstand rainfall and spray; either associated with severe hurricanes, or independently thereof. For instance, discuss the ability of site drainage, including the roofs of safety-related structures and exterior penetrations, to safely store or pass runoff without a loss of function.