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WILLIAMS,J.W. Florida Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION
VARGA,S.A. Operating Reactors Branch 2

SUBJECT: Responds to NRC 840813 Questions 5a,b & c in request for addl info re application for amend to Licenses DPR-31 & DPR-41,changing structural design of spent fuel pit & new storage racks.

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P. O. BOX 14000, JUNO BEACH, FL 33408

FLORIDA POWER & LIGHT COMPANY

October 9, 1984
L-84-278

Office of Nuclear Reactor Regulation
Attention: Mr. Steven A. Varga, Chief
Operating Reactor Branch #1
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Varga:

Re: Turkey Points Units 3 & 4
Docket Nos. 50-250 & 50-251
Proposed Amendment to
Spent Fuel Storage Facility Expansion
Additional Information

By letter dated August 13, 1984, the NRC requested additional information regarding the structural design of the spent fuel pit and new storage racks. Responses to these questions were submitted to the NRC via our Letter No. L-84-263, dated September 28, 1984. In a subsequent telephone conversation with Mr. Clyde Herrick of Franklin Research Center, Florida Power & Light Company was requested to submit supplemental information for Questions 5a, b and c.. The attachment to this letter provides this supplemental information in addition to a minor revision to our response to Question 12.

If you have any questions, please contact us.

Very truly yours,

for C. W. Woody

J.W. Williams, Jr.
Group Vice President
Nuclear Energy

JWW/GJK/mp

Attachment

cc: J.P. O'Reilly, Region II
Harold F. Reis, Esquire

A001
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FLORIDA POWER & LIGHT COMPANY
TURKEY POINT UNITS 3 & 4
PROPOSED AMENDMENT TO SPENT FUEL
STORAGE FACILITY EXPANSION
SUPPLEMENT TO REQUEST FOR ADDITIONAL
INFORMATION - STRUCTURAL BRANCH

In a telephone conversation with Florida Power & Light Company and Westinghouse on October 3, 1984, Mr. Clyde Herrick of Franklin Research Center requested that supplemental information be added to the responses to Questions 5a, b and c, which were submitted to the NRC by our Letter L-84-263, dated September 28, 1984. These questions and our response are provided below. In addition, a minor revision to Question 12 is also provided. The supplemental information added to each question is underlined for clarity.

5. With regard to the simplified 2-D non-linear model, please respond to the following:

   a. Describe how the seismic loads were applied onto the model.

      RESPONSE: The seismic loads were applied onto the model as simultaneous vertical and horizontal acceleration time histories.

      The analytical model of the fuel assembly used in this model was verified by comparison to fuel assembly test data. The first test was a natural frequencies test to verify model's beam properties and the rotary spring stiffnesses. The second test consisted of the fuel assembly in air impacting on a rigid surface to determine the fuel assembly grid impact stiffness and impact damping values. The grid impact damping value was found to be 25%.

   b. Discuss how this model could be used to simulate the 3-D non-linear structural behavior exhibited by the fuel rack.

      RESPONSE: The non-linear analysis is performed on a 2-D finite element model using a time history input of a horizontal shock and a vertical shock. The linear model used in the analysis is a 3-D model which is run for two horizontal directions. The loads for each horizontal direction are adjusted by load factors from the non-linear analysis, and thus include the effects of both a horizontal and a vertical event. The results of the two direction loads are then combined by the SRSS to account for the three seismic events. The E-W horizontal and N-S horizontal response spectra are identical.

   c. Discuss how the time step of integrations was established in the analysis concerning the solution stability and convergence.

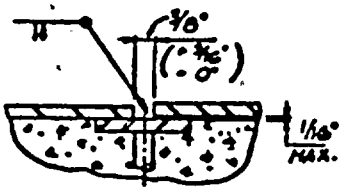
RESPONSE: A time step study is performed for a range of time steps. From the results of this study, it is possible to determine the time step which gives a converged solution. Refinement of the time step beyond this value will not significantly affect the results.

For this project the time steps used in the nonlinear analysis were 0.001 seconds for the Region 1 racks and 0.005 seconds for the Region 2 racks. The time step study performed verified that these time steps resulted in a converged solution.

12. Please discuss the design of the weld connections between the stainless steel liner plates.

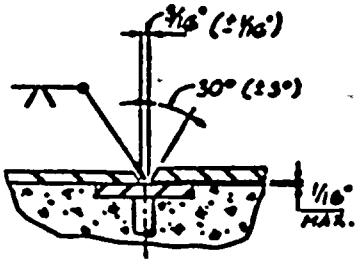
RESPONSE: The 1976 liner repair/replacement and acceptance criteria are discussed in Updated FSAR Section 14E. The liner plate is not a structural element. The loading from the stored fuel is transferred to the concrete mat through the embedded plates. The liner plate was not designed to act with the concrete as a composite section. Monitoring trenches are provided behind the liner for detecting and collecting any leakage. Any leakage is directed to the waste disposal drainage system, thus preventing uncontrolled leakage of fuel pool water.

In support of the leak prevention function, the liner plates are welded to each other or to embedded plates using seam welds which were sized for hydrostatic and thermal loads. Vertical seams in the wall liner plates are square butt or bevel butt welds with embedded 1/4" x 2" continuous bars serving as backing bars (Figures 1 and 2). Horizontal seams in the wall liner plates are fillet welds between the plate edges and the embedded 1/4" x 21" continuous bars (Figure 3). Seams in the floor liner plate are fillet welds between plate edges and embedded plates or bars. In the cask laydown area, the surfaces of the seams are maintained flush with the floor by use of 1/4" square filler bars and bevel filler welds (Figure 4). The seam details in other areas of the floor are similar, except that the filler bar used is 1/2" x 3/8" (Figure 5); This results in the top of the seam projecting above the floor surface.



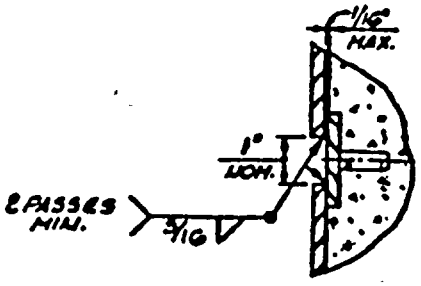
SQUARE BUTT

FIGURE 1



BEVEL BUTT

FIGURE 2



TYPICAL HORIZONTAL
WELD JOINT DETAIL

FIGURE 3

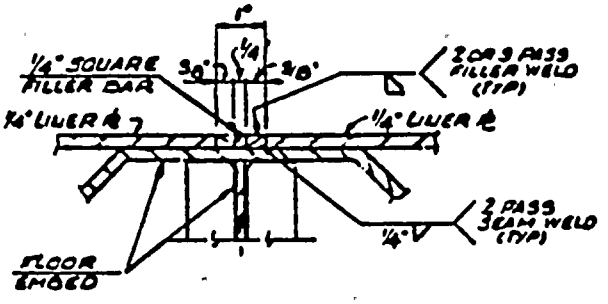


FIGURE 4

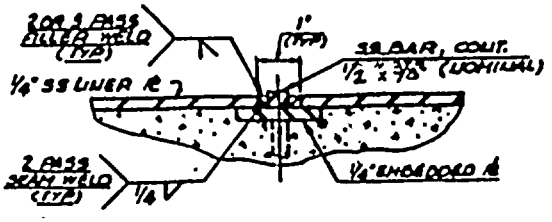


FIGURE 5