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JULY 29 1980

Docket Nos. 50-250
and 50-251

Dr. Robert E. Uhrig, Vice President
Advanced Systems and Technology
Florida Power and Light Company
Post Office Box 529100
Miami, Florida 33152

Dear Dr. Uhrig:

Your letter of November 10, 1978 (L-78-355) responded to our letter of May 18, 1978 which requested information concerning the fracture toughness and potential for lamellar tearing of steam generator and reactor coolant pump support materials for the Turkey Point Plant Unit Nos. 3 and 4. On May 19, 1980 we sent you a letter which discussed the comment copy of NUREG-0577 and solicited comments by July 7, 1980 (later extended to July 21, 1980). This letter also indicated that, although the Turkey Point Plant had not been reviewed in time to include the results in the comment copy of NUREG-0577, it was then under review.

The above mentioned review has been completed and the Turkey Point facilities are classified as Group 1 according to NUREG-0577. Therefore, further evaluation of the adequacy of the steam generator and reactor coolant pump supports will be required. Enclosed is a request for the additional information which will be needed for our review. We request that you respond within 30 days from the receipt of this letter.

Sincerely,

Original signed by
Thomas M. Novak

Thomas M. Novak, Assistant Director
for Operating Reactors
Division of Licensing

Enclosure:
Request for Additional
Information

cc: w/enclosure
See next page

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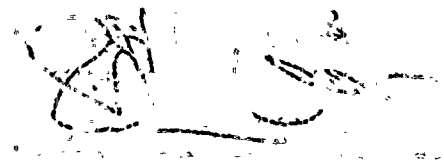

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

July 29, 1980

Docket Nos. 50-250
and 50-251

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Advanced Systems and Technology
Florida Power and Light Company
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Miami, Florida 33152

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Sincerely,

Thomas M. Novak, Assistant Director
for Operating Reactors
Division of Licensing

Enclosure:
Request for Additional
Information

cc: w/enclosure
See next page

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REQUEST FOR ADDITIONAL INFORMATION

LOW FRACTURE TOUGHNESS

FLORIDA POWER AND LIGHT COMPANY

TURKEY POINT UNITS 3 AND 4

NRC DOCKET NO. 50-250 AND 50-521

NRC TAC NO. 08793 AND 08794

ITEM 1 CONCERN

Figures 6 and 7, [Bechtel Drawing numbers 5610-C194 (Rev. 3) and 5610-C196 (Rev. 3), respectively] accompanying Florida Power and Light Company's letter of Nov. 10, 1978 to NRC, show the S/G and RCP support columns are laterally braced, at the top, to compartment walls. No. 18 rebar extends out from embedment to act as studs to secure the bracing. These rebar are ordered to ASTM A-432, a specification that does not assure fracture toughness.

These rebar appear to be simultaneously:

1) Important to support structural integrity
2) Of relatively poor fracture toughness
3) Thick and notched by threads - two conditions individually notorious as promoters of brittle behavior, and
4) Not readily inspectable.

On the other hand, the rebar pattern (16 bars per support) provides considerable redundancy, and design stresses are not obviously excessive.

REQUEST

In order that the fracture toughness adequacy of these rebar may be evaluated, please provide:

a) Results of inspections of the rebar made to date and plans (if any) for future inspections. State how such inspections are performed and what region of the rebar is so inspected.

b) Provide evidence to assure that all thermal expansions are actually being fully accommodated by the mechanisms the design provides for this purpose. Results of past inspections of wear in and around thermal expansion slots may provide acceptable evidence on this point. Discuss such wear patterns in relationship to the possibility that rebar might be subjected to anticipated cyclic thermal loads during routine plant operations.

c) Mill test reports for the heat(s) for this rebar. Include also any special ordering requirements and results of any other tests indicative of fracture toughness that may have been performed.

If it is found that no relevant evidence is available under Items (a) and (c) above (i.e., if rebar fracture toughness is unknown and inspections are not made), testing of rebar samples may become necessary.

Preferred sources of samples are materials possibly retained at the plant from original construction or at the mill from the same heat. If not otherwise available, samples may have to be taken from the structure.

It is requested that a search for suitable sources of samples be made for this ASTM A-432 rebar and their availability be reported. If no source is found, please identify locations in the structure where material for coupons (see ASTM A-370, Section 18 and 19 for required size and number) can best be taken with least impact on structural integrity.

ITEM 2 CONCERN

NUREG 0577 ranks steel specifications according to the fracture toughness of products typically supplied under each specification when no additional material requirements are included in the procurement order. A Group II rating is assigned to specifications governing steel of intermediate fracture toughness.

NUREG 0577 also establishes NDT criteria to screen steels for their suitability for use in S/G and RCP supports. Certain Group II steels meet these screening criteria in applications where members are thin, but fail them if members are thick. Thus, although use of these steels in thin sections is acceptable, no outright sanction for thick section use is granted. In such cases fracture-toughness adequacy must be evaluated for each specific application. Guidance as to methods, acceptable to NRC, for making such evaluations is also supplied by NUREG 0577.

The design of the supports for the Turkey Point nuclear power station, Units 3 and 4, incorporates thick section use of the following Group II steels which do not meet the NDT screening criteria:

1.) ASTM A-302

2.) ASTM A-588

REQUEST

In order that the fracture-toughness adequacy of such applications may be evaluated, please submit the following information:

a) Identify all applications where these steels are used in thick sections. An acceptable procedure for making such determinations is to use the formula:

$$t_c = 2.5 \left(\frac{K_{ID}}{\sigma_{yD}}\right)^2$$

Where: σ_{yD} is the dynamic yield strength of the steel.

K_{ID} is the nominal minimum assured fracture toughness of the steel in accordance with values supplied by NUREG 0577.

t_c is the critical thickness. In members thicker than t_c, brittle (i.e., plane strain) behavior may be expected.

If adequately documented, other procedures may be employed in making this determination. For example, if other K_{ID} values specific to the steel used in the application are known from mill or other tests these may be used in lieu of values taken from NUREG 0577.

b) For structual members found to be thick, please submit the following information.

1. Mill test records for these members. Any additional available information which may be indicative of fracture toughness (e.g., supplementary material specification requirements or other test results).

2. Identify which of the thick members is most highly stressed in tension on the thick section.* Report the most severe primary stress and the most severe primary-plus-secondary stress found, the station at which these occur, and the loading combination(s) that produces them.

c) Please furnish a fracture-toughness evaluation of the condition identified in Item (b, 2) above. Guidance as to acceptable means for making this evaluation is provided by NUREG 0577.

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*In making this determination consider each thick member individually. For each, identify the loading combination which most highly stresses the thick material at its most critical station. For example, if the member is a thick Flange I-Beam, the most highly stressed location in the Flange should be considered. Compare these stresses among all members. Only the results for the member found to most highly stressed need be reported.

CONCERN

Information relating to welding practices was deemed insufficient to enable evaluation of their fracture-toughness adequacy.

REQUEST

For the following weld joints:

a. Pump support assembly plat-to-plate weld [MC 6 to MC 7 in unit 3 shown in detail M in Fig. 24 (Dwg. 142858E)]

b. Column web and flange welds to plate MC 6 in units 3 of Fig. 24 (Dwg. 142858E)

c. Steam generator column web and flange welds to plate in Section G of Fig. 7

d. Steam generator plate-to-plate weld in Section C of Fig. 7 (similar to Item a above)

Please furnish the following information:

a. What specific welding materials were used (electrode type and diameter, and flux if applicable)

b. What welding conditions were used (position, current, and voltage)

c. What welding sequence was used (which sections or sides were welded first, last, etc., during welding?)

d. What post weld heat treatment was used (time, temperature) and how was this done? How was the temperature monitored?