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Docket No. 50-302

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Mr. Walter S. Wilgus
Vice President, Nuclear Operations
Florida Power Corporation
ATTN: Manager, Nuclear Licensing
& Fuel Management
P. O. Box 14042; M.A.C. H-2
St. Petersburg, Florida 33733

Dear Mr. Wilgus:

By letters dated October 31, 1984, and March 22, 1985, and supplemented by letter of May 13, 1985, you requested relief from certain examination and hydrostatic testing requirements of the 1974 Edition through Summer 1975 Addenda and the 1980 Edition through Winter 1981 Addenda of Section XI of the ASME Boiler and Pressure Vessel Code.

The enclosed Safety Evaluation (SE) contains our findings with respect to the requests for relief. Relief Request #150 is not granted as requested. However, we recognize that you would not be in violation of any requirements at this time and you have agreed to alternative measures which are discussed in the enclosed SE. Relief request #120 was withdrawn by your letter dated June 19, 1985.

Relief granted is based upon our review of information submitted in support of your determination that the applicable ASME Code Inservice Inspection requirements would be impractical to perform at Crystal River Unit 3. We have determined that the testing for which relief has been requested and granted is impractical. Pursuant to 10 CFR Part 50.55a(g)(6)(i), the granting of relief is authorized by law and will not endanger life or property or the common defense and security and is otherwise in the public interest. In making this determination, we have given due consideration to the burden that could result if these requirements were imposed on your facility.

The staff notes that you are using both the 1974 and 1980 Editions of Section XI for hydrostatic testing requirements as indicated by Relief Requests #120 and #210. 10 CFR 50.55a(g)(4)(iv) allows inservice examinations and system pressure tests to meet the requirements in later approved editions and addenda of Section XI subject to Commission approval. By letter dated March 8, 1985, the NRC approved the use of the 1980 Edition through Winter 1981 Addenda of Section XI for hydrostatic testing requirements for Crystal River Unit 3. Since the intent of the Regulation is to update the requirements for

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Mr. Wilgus

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all systems, even though technically there are no changes for hydrostatic testing of Class 3 systems in the 1974 and 1980 Editions of Section XI, the 1980 Edition of the Code should be referenced in any future relief request.

Sincerely,

*ORIGINAL SIGNED BY

JOHN F. STOLZ*

John F. Stolz, Chief
Operating Reactors Branch #4
Division of Licensing

Enclosure:
Safety Evaluation:

cc w/enclosure:
See next page

*See previous white for concurrences:

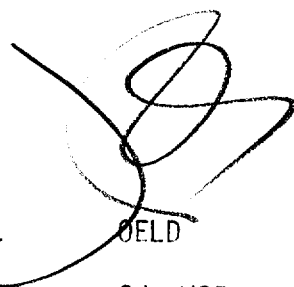
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6/17/85

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Mr. Wilgus

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We have been informed that because of recent changes in the facility, Relief Request #120 is unnecessary. If this is the case, Relief Request #120 should be withdrawn, and the relief granted herein will be considered void.

JF

Sincerely,

John F. Stolz, Chief
Operating Reactors Branch #4
Division of Licensing

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Safety Evaluation:

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Mr. Wilgus

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John F. Stolz, Chief
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Mr. W. S. Wilgus
Florida Power Corporation

Crystal River Unit No. 3 Nuclear
Generating Plant

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO REQUESTS FOR RELIEF FROM INSERVICE
INSPECTION REQUIREMENTS
FLORIDA POWER CORPORATION, ET AL
CRYSTAL RIVER UNIT 3 NUCLEAR GENERATING PLANT
DOCKET NO. 50-302

I. INTRODUCTION

10 CFR 50.55a requires that inservice examinations and tests be performed in accordance with the requirements of the applicable edition and addenda of Section XI of the ASME Code unless such requirements are impractical to perform and relief from those requirements is granted by the Commission. By letters dated October 31, 1984, and March 22, 1985, as supplemented May 13, 1985, the licensee requested relief from certain examination and testing requirements of the 1974 Edition through Summer 1975 Addenda and the 1980 Edition through Winter 1981 Addenda of Section XI determined to be impractical to perform at Crystal River Unit 3. The letters also contained information supporting the determinations and the requests. This report provides a safety evaluation of the licensee's requests and the staff's basis for approval or denial of each request pursuant to 10 CFR 50.55a(g).

II. EVALUATION OF RELIEF REQUESTS

The licensee has requested relief from certain examinations and hydrostatic tests that they have determined to be impractical. Pursuant to 10 CFR 50.55a(g)(6)(i), this information has been reviewed and evaluated with the necessary findings made to grant relief from the requirements as requested by the licensee, except for the surface examination requirement for the core flood nozzle-to-safe end and safe end-to-pipe welds (Relief Request #150). The requests, Code requirements, licensee's bases for the requests, alternative examinations and tests, and our evaluations and conclusions are given below.

- A. Relief Request #110 - Relief is requested from the volumetric examination requirement for 10% of the peripheral (approximately 3) control rod drive mechanism (CRDM) housing welds.

Code Requirement (1974 Edition, Summer 1975 Addenda)

Volumetric examination of control rod drive housings shall include the weld metal and base metal for one wall thickness beyond the edge of the weld. The examinations performed during each inspection interval shall include 10% of the peripheral control rod drive housings. The examinations may be performed at or near the end of the inspection interval.

Licensee's Basis For Requesting Relief

The licensee has determined that the Code requirement is impractical. Approximately six CRDM housings have been scheduled for removal for maintenance or cleaning. The housings are not peripheral housings as required by Section XI. Radiation exposure can be reduced by examining the CRDMs that have been removed for maintenance or cleaning rather than examining them on the vessel head.

Proposed Alternate Examination

Volumetric examinations will be performed on any six CRDM housings which is approximately 10% of all CRDM housings.

Staff Evaluation

The basis for the Code requirement to examine 10% of the peripheral CRDMs is the accessibility of the outer CRDM housings. The alternate examination sampling plan proposed by the licensee is viewed as a better sampling plan and the number of housings that will be examined exceeds Code requirements. In addition, performance of the alternate examination will reduce total occupational exposure. The requirement to examine 10% of the peripheral CRDMs is impractical because of the additional time and radiation exposure involved which would result in an unnecessary burden to the licensee without a commensurate increase in safety.

- B. Relief Request #120 - Relief is requested from the requirements to perform a hydrostatic test on the Chilled Water System header.

By letter dated June 19, 1985 and clarified in discussions with the licensee on June 24, 1985, the licensee informed us that during Refuel V modifications, the chilled Water Header was hydrostatically tested in accordance with Code requirements. Thus, this relief request is no longer required.

- C. Relief Request #130 - Relief is requested from the requirements to perform visual and volumetric examinations of the reactor coolant pump casing welds and interior surfaces.

Code Requirement (1974 Edition, Summer 1975 Addenda)

- (1) Code Item No. B5.6, Category B-L-1 - Volumetric examination, to include 100% of pressure retaining welds of one pump in each group of pumps performing similar functions in a system. The examinations shall be performed during each inspection interval and may be performed at or near the end of the inspection interval.

- (2) Code Item No. B5.7, Category B-L-2 - Visual examination of the internal pressure boundary surfaces on one pump in each of the group of pumps performing similar functions in the system during each inspection interval. The examinations may be performed at or near the end of the inspection interval.

Licensee's Bases For Requesting Relief

The licensee has determined that performing the above examinations is impractical and considers the requests for relief from these two Code requirements justified for the following reasons:

- (1) Visual and volumetric examination of the pump internal surface will require disassembly of the pump. The pump manufacturer (Byron Jackson) does not require or recommend pump disassembly to perform normal maintenance or inspections.
- (2) Disassembly of the pump for inspection could result in significant damage. The pumps were designed prior to ISI requirements and ease of disassembly in the field was not part of the design basis.
- (3) There have been no reported failures of the casing welds in these pumps. Crystal River Unit 3 has had no operational problems with the pump that indicate potential degradation of the casing welds.
- (4) The reactor coolant pump casing consists of three type 316 stainless steel cast rings. This type of material is widely used in the nuclear industry and has performed extremely well.
- (5) It is estimated that this reactor coolant pump casing examination will result in at least 40 man-rem exposure. The radiation exposure at Crystal River Unit 3 for ISI work in the 1983 refueling outage was approximately 32.5 man-rem. The reactor coolant pump casing examination, if conducted, would more than double this figure for the 1985 refueling outage. The increased radiation exposure expected in performing this examination far exceeds any beneficial safety improvements that might be achieved.
- (6) The pump disassembly, inspection, and reassembly is estimated to cost approximately \$550,000. The excessive cost of performing this examination far exceeds any beneficial safety improvements that might be achieved.

Proposed Alternate Examinations

The reactor coolant pump casing exterior will be visually inspected during the hydrostatic pressure tests required by IWB-5000. In addition, a surface examination will be performed on 25% of the

length of each weld per inspection interval so that both welds will be completely examined within the lifetime of the component.

The alternate examinations will be performed at or near the end of the first ten-year interval. The licensee will perform a visual inspection of the pump's interior surface and reevaluate the need for performance of a volumetric examination if maintenance or operational problems which require disassembly of the pump internals are encountered.

Staff Evaluation

Considering the pump design, materials of construction of the pump casing, and the radiation levels associated with performing the required examinations, we find the examinations impractical to perform. In lieu of the volumetric examination of the pump casing weld and visual inspection of the internal surfaces, the licensee has committed to perform a surface examination of the welds. In addition to the surface examination, a visual inspection of the casing exterior surface will be performed during the hydrostatic test of the reactor coolant system. In the event that the pump has to be disassembled for operational or maintenance purposes, the required visual inspection of the internal surfaces will be considered.

We have determined that the surface and visual examinations of the pump casing will provide adequate assurance of its structural integrity.

D. Relief Request #140

Relief is requested from the examination requirements for the reactor vessel support skirt weld.

Code Requirement (1974 Edition, Summer 1975 Addenda)

Volumetric examination of the integrally-welded vessel support skirt during each inspection interval. The examination shall cover at least 10% of the circumference of the weld to vessel. This includes the welds to the vessel and the base metal beneath the weld zone and along the support attachment member for a distance of two support thicknesses.

Licensee's Basis for Requesting Relief

In a letter dated April 14, 1977, the licensee informed the NRC that Crystal River Unit 3 did not have integrally welded vessel supports and was, therefore, not required to examine them. This was based on the ASME Code, Section XI, 1974 Edition through Summer 1975 Addenda. It was later determined through examination of the Winter 1976 Addenda to ASME Section XI that the reactor vessel

supports at Crystal River Unit 3 are considered by the Code to be integrally welded. This was documented in a letter to the NRC dated July 15, 1977. The licensee is again requesting relief from the requirement to perform a volumetric examination of the reactor vessel support weld.

The licensee has determined that the examination requested is impractical. The radiation level in the area of the reactor vessel support skirt-to-vessel weld is estimated to be as high as 1000 R/hr. This radiation field is due to the position of the incore detectors and contamination in the area due to the reactor coolant drain tank rupture that occurred on February 26, 1980. This high radiation level combined with the necessity for insulation removal and the amount of time required to obtain acceptable examination results make it impractical to examine this weld volumetrically. The licensee has since stated that radiation levels as low as 12 R/hr are achievable in this area.

This weld is not considered part of the Section XI, Class 1 (IWB) boundary under the requirements of the 1980 Edition through Winter 1981 Addenda and, therefore, would be exempt from volumetric examination requirements.

Proposed Alternate Examination

The licensee's initial submittal of October 31, 1984, contained no proposed alternate examination. By letter dated May 13, 1985, the licensee proposed an alternative visual examination to be performed on 10% of the reactor vessel support skirt to vessel weld. The examination will be conducted at three positions along the length of the weld at approximately 120 degree segments. Prior to the inspection, a survey of the area will be taken and provisions will be made to keep worker exposure as low as reasonably achievable (ALARA).

Staff Evaluation

The reactor vessel support skirt-to-vessel weld is impractical to examine volumetrically considering access for examination equipment, the necessity of insulation removal, the amount of time required to obtain acceptable results from the examination, and personnel exposure to relatively high levels of radiation. Considering the radiation levels in the area of support skirt, the visual inspection proposed by the licensee is the most practical examination method. The visual inspection will provide adequate assurance that the structural integrity of the weld has not been compromised.

- E. Relief Request #150 - Relief is requested from the surface examination requirement for the Core Flood Nozzle-to-Safe End and Safe End-to-Pipe welds.

Code Requirement (1974 Edition, Summer 1975 Addenda)

Volumetric and surface examinations shall be performed on pressure-retaining dissimilar metal welds during each inspection interval and shall cover the circumference of 100% of the welds. The areas examined shall include the welds and base material for, at least, one wall thickness beyond the edge of the welds.

Licensee's Basis For Requesting Relief

The licensee has determined the surface inspection to be impractical. Approximately 40 man-hours would be required to prepare each of the two core flood nozzle safe ends for inspection. The preparation would involve removal of the refueling canal seal plate, barite filled plugs, and insulation. The radiation levels in this area are expected to be approximately 1 to 2 R/hr, for an estimated total exposure of 40 to 80 man-rem. Shielding is considered impractical in this area. Any remote inspection would require approximately the same preparation work.

Proposed Alternate Examination

As an alternative, the licensee proposed to ultrasonically examine the welds from the inside surface.

Staff Evaluation

The core flood tanks inject water directly into the reactor vessel following a break in the primary pressure-retaining boundary, thereby providing a vital source of water for reactor core cooling. The type of welds for which relief from surface examination has been requested is of concern because of past experience of inservice flaw initiation in a number of plants. Assurance that the welds and base metal in the core flood system are structurally sound must therefore be provided by either performing both the required examinations or an alternative that will provide equivalent or superior results. We therefore find that the increase in safety by performing the required surface examination or an equivalent alternative outweighs the impracticalities cited by the licensee.

The alternative examination proposed by the licensee, ultrasonic examination from the inside diameter (I.D.), has not been shown to be sufficient in itself to provide the degree of assurance necessary that outside diameter (O.D.) flaws will be detected. We require that either (1) the licensee demonstrates by the next refueling outage that O.D. flaws can be detected utilizing the ultrasonic testing (U.T.) method, procedure, and instrument used to perform the U.T. examination of the core flood nozzle-to-safe end and safe end-to-pipe welds, or (2) perform the surface examination requirement during the next refueling outage.

- F. Relief Request #210 - Relief is requested from performing the hydrostatic test requirement after modification of the Emergency Feedwater System piping between the steam generators and the first valves upstream that provide positive isolation.

Code Requirement (1980 Edition, Winter 1981 Addenda)

The system hydrostatic test pressure shall be at least 1.25 times the system pressure P_{SY} for systems with Design Temperature above 200°F. The system pressure P_{SY} shall be the lowest pressure setting among the number of safety or relief valves provided for overpressure protection within the boundary of the system to be tested.

Licensee's Basis For Requesting Relief

The licensee has determined that the Code requirement is impractical. Modifications to the Emergency Feedwater System are planned for the current refueling outage. The modifications include the addition of a flange to the auxiliary feedwater header to allow for steam generator cleaning and an NRC mandated upgrade to the Emergency Feedwater System. Hydrostatic testing the emergency feedwater line after modifications would be impractical since it would involve pressurization of the steam side of the steam generators. Filling this section of piping with water could overstress the pipe and associated supports making this procedure highly undesirable to perform.

Proposed Alternate Examinations

All Emergency Feedwater System welds which cannot be hydrostatically tested will be subjected to magnetic particle testing and radiographic examinations.

Staff Evaluation

The modification of the Emergency Feedwater System entails construction of welds in the system that are required to be hydrostatically tested to 1.25 times the lowest setting of the relief or safety valves in the main steam or feedwater system because the portion of piping being modified cannot be isolated from these systems. Considering the limited number of design pressure cycles allowed for the steam generator shells, the compatible materials being welded, and the non-destructive examinations (MT and RT) that will be performed on the welds, we find the requirement impractical to perform and that imposition of the requirement would not serve to increase significantly the safety of the plant. However, we will require that an inservice leak check of the subject welds be performed at operating pressure during startup from the outage in which the modifications are made.

We conclude that relief from the hydrostatic test requirement for

the welds may be granted provided the alternate examination proposed and the inservice leak check of the welds are performed and that performing the examinations and leak check will provide the necessary assurance of the structural integrity of the Emergency Feedwater System welds.

III. CONCLUSIONS

With respect to Relief Requests Nos. 110, 130, 140 and 210, the Commission grants the requested relief, subject to performance of the proposed and imposed alternative examinations as noted above, pursuant to paragraph 10 CFR 50.55a(g)(6)(i), based on our finding that certain specific requirements of Section XI of the ASME Boiler and Pressure Vessel Code, 1974 Edition through Summer 1975 Addenda, and the 1980 Edition through Winter 1981 Addenda, are impractical. Implementation of the requirements would result in hardships or unusual difficulties without a compensating increase in the level of quality or safety. We conclude, based on the considerations discussed above, that the granting of this relief is authorized by law and will not endanger life or property or the common defense and security and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

With regard to Relief Request No. 150, we have determined that the licensee has not shown that the proposed alternate examination (U.T. from the I.D.) is sufficient in itself to assure that O.D. flaws will be detected. Therefore, in addition to its proposed alternate examination, the licensee shall by the next refueling outage, either (1) demonstrate that O.D. flaws can be detected reliably using U.T. from the I.D., or (2) perform the required surface examination. Relief from the surface examination requirement until that time is appropriate since the 10-year interval for this examination will not expire until after the next scheduled refueling shutdown.

IV. REFERENCES

- a. Letter, E. C. Simpson, Florida Power Corporation, to H. R. Denton, NRC/NRR dated October 31, 1984.
- b. Letter, G. R. Westafer, Florida Power Corporation, to H. R. Denton, NRC/NRR dated March 22, 1985.
- c. Letter, G. R. Westafer, Florida Power Corporation, to H. R. Denton, NRC/NRR dated May 13, 1985.

Dated: June 27, 1985

Principal Contributor: George Johnson