

February 5, 2001

Mr. Thomas F. Plunkett  
President - Nuclear Division  
Florida Power and Light Company  
P.O. Box 14000  
Juno Beach, Florida 33408-0420

SUBJECT: TURKEY POINT PLANT, UNITS 3 AND 4 - EVALUATION OF RELIEF  
REQUEST NO. 21 REGARDING IMPLEMENTATION OF SUBSECTIONS IWL  
AND IWA OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS  
SECTION XI FOR CONTAINMENT INSPECTION (TAC NOS. MB0455 AND  
MB0456)

Dear Mr. Plunkett:

By letter dated November 7, 2000, Florida Power and Light Company submitted a request for relief (RR), No. 21, from certain requirements of Subsections IWL and IWA of the American Society of Mechanical Engineers, Section XI, Boiler and Pressure Vessel Code, regarding containment inspection.

On the basis of the enclosed safety evaluation, the U. S. Nuclear Regulatory Commission staff has determined that the licensee's proposed alternative would provide an acceptable level of quality and safety, and the relief is hereby authorized pursuant to Title 10 of the *Code of Federal Regulations*, Section 50.55a(a)(3)(i).

This completes the staff review of TAC Nos. MB0455 and MB0456. If you have any comments, please contact Kahtan Jabbour at (301) 415-1496.

Sincerely,

**/RA/**

Richard P. Correia, Chief, Section 2  
Project Directorate II  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket Nos. 50-250 and 50-251

Enclosure: As stated

cc w/encl: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST FOR RELIEF FROM ASME SECTION XI REQUIREMENTS

FOR CONTAINMENT INSPECTION

FLORIDA POWER AND LIGHT COMPANY

TURKEY POINT PLANT, UNITS 3 AND 4

DOCKET NOS. 50-250 AND 50-251

1.0 INTRODUCTION

In the *Federal Register* dated August 8, 1996 (61 FR 41303), the U. S. Nuclear Regulatory Commission (NRC) amended its regulations to incorporate by reference the 1992 Edition with 1992 Addenda of Subsections IWE and IWL of Section XI of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code). Subsections IWE and IWL provide the requirements for inservice inspection (ISI) of Class CC (concrete containment), and Class MC (metallic containment) of light-water cooled power plants. The effective date for the amended rule was September 9, 1996. The rule requires nuclear power plant licensees to incorporate the new requirements into their ISI plans and to complete the first containment inspection by September 9, 2001. However, a licensee may propose alternatives to or submit a request for relief from the requirements of the regulation pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Sections 50.55a(a)(3) and (g)(5).

By letter dated November 7, 2000, Florida Power and Light Company (FPL or the licensee) proposed an alternative to the requirements of Subsections IWL and IWA of Section XI of the ASME Code for its Turkey Point Plant, Units 3 and 4. The NRC staff evaluation and findings with respect to the alternative proposed by the licensee are discussed below.

2.0 EVALUATION

2.1 Relief Request RR-21

2.1.1 Code Requirements:

Subsection IWL, Paragraph IWL-2310, "Visual Examination and Personnel Qualification," and Subsection IWA, Paragraph IWA-2210, "Visual Examinations," of the ASME Code, Section XI, 1992 Edition, 1992 Addenda require specific minimum illumination and maximum direct examination distance for all concrete surfaces (minimum illumination 50 fc for VT-1C and VT-3C, and maximum direct examination distance 2 feet for VT-1C and 4 feet for VT-3C).

### 2.1.2 Code Requirements for Which the Relief is Requested:

The relief is requested from meeting the ASME Code, Section XI, 1992 Edition, 1992 Addenda, Subsection IWL, Paragraph IWL-2310, "Visual Examination and Personnel Qualification," and Subsection IWA, Paragraph IWA-2210, "Visual Examinations," regarding the required minimum illumination and maximum direct examination distance for performing VT-1C and VT-3C examinations on concrete surfaces.

### 2.1.3 Proposed Alternative:

FPL proposes to perform a large part of the examinations described in Subsection IWL, Paragraph IWL-2510, remotely. As such, the maximum direct examination distance specified in Table IWA-2210-1 will be extended and minimum illumination requirements specified in Table IWA-2210-1 will be reduced. Visual examination will be performed with adequate illumination to detect evidence of degradation. The Responsible Engineer (RE) will use either the Table IWA-2210-1 test chart characters or test samples to determine the resolution required to ensure that indications of interest are detectable. As an alternative, the RE may use gray cards or the fine line scales of a rule for that purpose. The RE will also determine the maximum size for indications of interest using the guidelines established by American Concrete Institute, document ACI 349.3R-96, "Evaluation of Existing Nuclear Safety-Related Concrete Structures." For remote visual examination, the procedure and equipment to be used will be demonstrated capable of resolving these minimum indications to the satisfaction of the RE.

### 2.1.4 Basis/Justification for Relief:

Title 10 CFR 50.55a was amended in the *Federal Register* (61 FR 41303) and the Final Rule was published in the *Federal Register* (64 FR 51370) to require the use of the ASME Code, Section XI, 1992 Edition, 1992 Addenda, when performing containment examinations. In addition to the requirements of Subsection IWL, the rulemaking also imposes the requirements of ASME Code, Section XI, 1992 Edition, 1992 Addenda, Subsection IWA for minimum illumination and maximum direct examination distance of Class CC components, specifically for the examination of concrete under Paragraph IWL-2510.

In accordance with IWA-2210, when remotely performing the visual examinations required by Subsection IWL, Paragraph IWL-2510, using remote techniques, the maximum direct examination distance specified in Table IWA-2210-1 may be extended, and the minimum illumination specified in Table IWA-2210-1 may be decreased. The change in examination distance and illumination requirements are allowed provided the remote examination procedure is demonstrated to resolve the required test chart characters in Table IWA-2210-1. The RE will use either the Table IWA-2210-1 test chart characters or test samples to determine the resolution required to ensure that indications of interest are detectable. As an alternative, the RE may use gray cards or the fine line scales of a rule for that purpose. The indications of interest using the guidelines established in ACI 349.3R-96. For remote visual examination, the procedure and equipment to be used will be demonstrated capable of resolving these minimum indications to the satisfaction of the RE. The record of demonstration will be available to regulatory authorities.

In order to conform with Section XI, IWA requirements for visual examination, Subsection IWL referenced VT-1 and VT-3 examinations, but designated them VT-1C and VT-3C to signify that

these were examinations of a concrete structure. The original VT-1 and VT-3 examinations in Subsection IWA were designed for use on metal surfaces. Flaw detection on metal surfaces requires the ability to resolve a much smaller indication than that required on concrete due to the small grain size of a metal surface in comparison to the much larger grain size of a cast concrete surface. The visual examination requirements for illumination level and examination distances are too restrictive to demonstrate that the remote visual examination is equivalent to the direct visual examination when performing examinations of concrete surfaces. The visual examination of a concrete containment is intended to uncover indications of significant conditions over a large area in a generally benign environment.

In the 1998 edition of the ASME Code, the requirements for a VT-1C examination have been replaced with a "detailed visual examination," and the requirements for a VT-3C examination have been replaced with a "general visual examination." The general visual examination of a concrete surface is performed under the direction of the RE to indicate the general structural condition of the containment. IWL-2000 references ACI-201.1 for guidelines used to determine concrete deterioration and distress. If the general visual examination detects any deterioration, the detailed visual examination is performed, again under the direction of the RE, to determine the magnitude and extent of the deterioration. Also, alternative lighting and resolution requirements have been added to Subsection IWL to be used in lieu of requirements of IWA-2000. The proposed alternative inspection method in this relief request is generally in compliance with the requirements of the 1998 edition of the ASME Code.

Relief is requested in accordance with 10 CFR 50.55a(a)(3)(i) since the proposed alternative provides an acceptable level of quality and safety. Inspecting the concrete surfaces using the increased distances and decreased illumination requirements, approved by the RE, will still allow the detection of flaws of a size sufficient to have an adverse effect on the concrete structure.

#### 2.1.5 Staff Evaluation of RR-21:

In lieu of meeting the Code requirements of the minimum illumination and maximum direct examination distance specified in IWA-2210 and Table IWA-2210-1, the licensee proposed to perform remote examinations with extended maximum direct examination distance and reduced minimum illumination to detect evidence of degradation. The licensee stated in its relief request that the RE will use either the Table IWA-2210-1 test chart characters or test samples to determine the resolution required to ensure that indications of interest are detectable. As an alternative, the RE may use gray cards or the fine line scales of a rule for that purpose. The RE will also determine the maximum size for indications of interest using the guidelines established in ACI 349.3R-96, "Evaluation of Existing Nuclear Safety-Related Concrete Structures." For remote visual examination, the procedure and equipment to be used will be demonstrated capable of resolving these minimum indications to the satisfaction of the RE.

According to the Code requirements, the performance of VT-1C and VT-3C examinations on the concrete containment based on the requirements specified in IWA-2210 and Table IWA-2210-1 is to determine if the damage or degradation, including cracks, wear, corrosion, erosion or other physical damage, warrants additional evaluation or repair of the structure. The staff finds that due to the nature of concrete, a concrete containment will have numerous, small "shrinkage-type" surface cracks or other imperfections that are not detrimental to the structural integrity of the containment. The staff also finds that the application of code

requirements (IWA-2210 and Table IWA-2210-1) for identifying these insignificant "shrinkage-type cracks" or other imperfections is not necessary and could result in a large number of man-hours for erecting scaffolding, using lifts, and evaluating insignificant indications. In addition, the performance of examinations on concrete surfaces using distances and illumination requirements determined by a knowledgeable RE will provide a reasonable degree of quality. Furthermore, the staff made changes to the requirements (10 CFR 50.55a(b)(2)(x)(B)) to allow the following: "When performing remotely the visual examinations required by Subsection IWE, the maximum direct distance specified in Table IWA-2210-1 may be extended and the minimum illumination requirements specified in Table IWA-2210-1 may be decreased provided that the conditions or indications for which the visual examination is performed can be detected at the chosen distance and illumination."

### 3.0 CONCLUSION

On the basis of the above evaluation, the staff finds that the alternative examination proposed by the licensee provides an acceptable level of quality and safety and is, therefore, authorized pursuant to 10 CFR 50.55a(a)(3)(i).

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Date: February 5, 2001

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**TURKEY POINT PLANT**

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