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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

FLORIDA POWER CORPORATION

REQUEST FOR RELIEF FROM ASME CODE REPAIR REQUIREMENTS

NUCLEAR CLOSED CYCLE COOLING (SW) SYSTEM

CRYSTAL RIVER NO. 3

DOCKET NO. 50-302

1.0 INTRODUCTION

In telephone conversations of and by letter dated November 6, 1992, Florida Power Corporation (FPC, the licensee), requested relief from the repair requirements of ASME Section XI in order to perform a temporary non-Code repair to the Nuclear Closed Cycle Cooling (SW) system at Crystal River Unit No. 3. The purpose of the temporary repair was to provide structural reinforcement and leak mitigation to an externally corroded and leaking 6-inch schedule 40 carbon steel pipe that is part of the SW system. The subject pipe and system are classified as ASME Code class 3. The SW system is a moderate energy safety-related system that conveys closed-cycle cooling water to a wide variety of safety-related equipment throughout the unit. The affected section of pipe connects the SW system surge tank to the SW pumps suction header. It conveys treated demineralized water. The leak cannot be isolated. Design conditions are 100 psig at ambient temperature.

The leak was attributed to sea water-induced corrosion of the unprotected exterior of the pipe. The subject pipe is installed in a floor trench which was periodically flooded with sea water when nearby sea water heat exchangers were drained for maintenance. The contact between the pipe and the standing sea water occurred principally on the underside of the line, which is not normally visible. The heavily pitted underside of the line was evidently perforated by one of the pits. The most severely corroded portion of this line encompassed an area roughly 18 inches long and 1/4 of the circumference, centered on the bottom or 6 o'clock position.

At the time of discovery and evaluation the leakage rate was insignificant - roughly 30 drops per minute. Due to the severely pitted exterior, an ultrasonic test (UT) survey of wall thickness was impractical. Descaling was judged to be unwise due to the possibility of exacerbating the leak. In the absence of an estimate of flaw size or bounding calculation, and due to the size of the most severely corroded area, the licensee concluded that structural reinforcement was required to maintain operability.

FPC determined that a Code repair was impractical because it could not be done with the plant on line. A plant shutdown lasting at least several days would be required to accomplish a Code repair, and in any event, FPC intends to replace this and other sections of pipe in this line for other reasons during the planned maintenance outage in the spring of 1993. FPC has also agreed to perform a baseline visual inspection and periodic visual inspection of the repair area.

2.0 DISCUSSION

A unique temporary repair was proposed. The affected pipe section would be encased in wire fabric-reinforced high strength grout. This would be accomplished by filling the trench with grout, encapsulating approximately 3 feet of the pipe, centered on the leak. This proposal would accomplish FPC's goals of reinforcing the pipe with respect to seismic and operating loads, and performing a leak mitigating function. Since the trench is approximately 2 feet deep by 2 feet wide, the resulting temporary repair would in effect be a heavy wall reinforced concrete "pipe" with outer dimensions of 2 x 2 x 3 feet. Support and restraint of this block would be provided by the trench wall and an existing imbedded seismic pipe stanchion adjacent to the leak. This seismic pipe support would become encased in the concrete block.

Reinforced concrete pipe is commonly used by the industry to convey sea water for service water systems. Generally these pipes are large diameter (3 feet or more) with wall thicknesses of 1 to 2 inches. Operating pressures are typically 50 psig on systems built with reinforced concrete pipe.

The staff judged the proposed temporary repair to be capable of withstanding the SW system hydrostatic forces. Pipe end pullout resulting from a postulated guillotine break would be prevented by the restraint of the rest of the system.

Since the flawed area was already adjacent to a seismically designed support, the effect of the proposed temporary repair was investigated to determine system loading impact. The degree of restraint of the concrete block would be higher than with the existing pipe stanchion. The licensee's analysis demonstrated that due to the low design loads, including thermal expansion, increased restraint would not adversely affect the system.

Because of the subject leak, FPC conducted an augmented visual inspection of the system. Two other pinhole leaks were discovered, which are to be the subject of a separate relief request. This relief request will also address action initiated to alleviate the corrosion rate of this system so that presently thinned but operable sections do not become substantially degraded prior to a planned spring 1993 overhaul. Due to I.D. erosion of portions of this system, FPC had existing plans to replace significant portions of it during the forthcoming maintenance outage.

3.0 CONCLUSION

Based on our review, we agree with FPC that a Code repair is impractical, as defined in GL 90-05, since the affected piping cannot be isolated without plant shutdown. The proposed temporary repair is acceptable. Pursuant to 10 CFR 50.55a(g)(6)(i), the Commission herewith grants the requested relief and requires FPC to perform the above noted inspections. We have determined these actions are authorized by law and will not endanger life or property or the common defense and security and are 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.

This will confirm verbal relief granted to FPC for this repair on November 6, 1992.

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Date: December 22, 1992