Florida
Power
CORPORATION
Crystal River Unit 3
Docket No. 50-302

November 13, 1992
3F1192-11

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

Subject: Repair of ASME Code Class III Piping

Reference: 1. FPC to NRC letter, 3F0192-04, dated January 29, 1992
2. FPC to NRC letter, 3F1192-07, dated November 6, 1992

Dear Sir:

Florida Power Corporation (FPC) is hereby requesting NRC approval of a temporary non-Code repair to moderate energy portions of the Crystal River Unit 3 Nuclear Closed Cycle Cooling (SW) system in accordance with the guidance provided in Generic Letter 90-05. The temporary non-Code repair is necessary to patch two small leaks which resulted from external corrosion of the pipe. Engineering evaluations of the pipe and associated flaws have determined that the SW system remains operable. FPC considers the leaks to be minor in nature and do not pose any operational concerns for the system. Therefore, approval and installation of the temporary repairs are not of an immediate nature.

Florida Power Corporation has previously submitted a response to Generic Letter 90-05, Reference 1, which addresses the handling of non-Code repairs and is awaiting the NRC's response prior to modifying our Repair and Replacement Program. In the interim, we are requesting approval for these repairs under the intent of the Generic Letter. Approval for a non-Code repair on this same portion of SW piping was received on November 6, 1992, Reference 2.

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The attached information provides a description of the SW system and pipe flaws, an impracticality assessment for a Code repair, a characterization of the flaws, and an augmented inspection and repair plan. A permanent repair which includes replacement of this and other portions of the SW system piping is already part of the planned scope of the 9M mid-cycle outage scheduled for the Spring of 1993.

Sincerely,

Gary Boldt

G. L. Boldt
Vice President
Nuclear Production

GLB:kEF

Attachment

xc: Regional Administrator, Region II
NRR Project Manager
Senior Resident Inspector

Temporary non-Code Repair
Nuclear Services Closed Cycle Cooling

System and Flaw Description

The portion of the Nuclear Services Closed Cycle Cooling (SW) system affected is approximately one hundred (100) feet of eighteen (18) inch diameter standard weight piping and thirteen (13) feet of six (6) inch schedule 40 piping. This section of piping constitutes the SW suction header from the surge tank to the SW pumps and contains closed cycle SW system demineralized water. This piping is externally corroded and has three known leak locations.

A leak in the six (6) inch portion of this pipe was identified during an earlier inspection and a non-Code repair request was granted by the NRC on November 6, 1992. Augmented inspections of this pipe has identified two additional leaks at the north end of the eighteen (18) inch suction header between the two suction risers for SW pump 1A. These leaks are approximately two (2) feet apart with leak rates of less than one drop per second. This is well within the system's makeup capabilities and does not pose any operational concerns. Since the leaks are located on the under side of the pipe and the pipe is contained within a trench there are no concerns associated with spray or flooding from these leaks adversely affecting required equipment.

Impracticality Determination

A Code repair would require removal of the entire SW system from service for an extended period of time to drain and repair or replace the affected portion of piping. The SW system provides normal and emergency cooling to a number of components important to plant operation as listed on the attached FSAR page 9-29. Thus, this cannot be accomplished on-line. The efforts to safely schedule such work during an outage are themselves quite challenging. Further, waiting until the plant can be taken to a mode where the repair can be accomplished would take many hours and the repairs several days whereas the proposed temporary repair can be accomplished in a matter of hours.

Flaw Characterization

The condition of the pipe and specific flaws are the result of long term exposure to seawater and surface condensation. The pipe is located in a trench that periodically floods with seawater and is subject to condensation buildup on the external surface during the winter months. As a result of exposure to these conditions, the external surface of the pipe has corroded and leak sites have developed.

The condition of the pipe was determined by visual and UT examinations. A series of perimeter UT measurements at various points along the length of the pipe were performed. An assessment of the overall condition of the pipe was made using the measurement profiles obtained. These augmented inspections indicate fairly uniform corrosion rates on the six (6) inch portion, whereas significant corrosion is limited to the lower third of the underside of the eighteen (18) inch section. Two leak locations on the eighteen (18) inch section of pipe were identified during these inspections.

The overall condition of the pipe section has been evaluated for B31.1 code compliance. The pipe was evaluated assuming reduced wall thicknesses as defined by the UT profiles. The eighteen (18) inch pipe was evaluated using a much reduced wall thickness for the lower 135 degree arch of the pipe and a slightly reduced wall thickness on the remaining portion. The six (6) inch section of the pipe was assumed to have a uniform wall thickness which was taken to be approximately 90 percent of the minimum UT reading. The results of this evaluation indicates that for deadweight, pressure, seismic and thermal loads the pipe continues to meet B31.1 code requirements.

The exact configuration of the flaws associated with the two leaks could not be clearly quantified. This was due to the rough and irregular surface. Normally, flaws requiring evaluation occur on the inside of pipes. This allows for UT examination from the 'smooth' outer surface and can usually provide the necessary information for reasonable flaw evaluations. The corroded outer surface has made it impossible to develop a precise picture of these leaks or sub-minwall flaws. Therefore, visual examinations were used at these locations to characterize the flaws as small localized pits that were conservatively modeled as 130 degree cones.

Flaw evaluation

The specific flaw locations were evaluated based on Generic Letter 90-05 requirements and the assumed flaw configuration. The local flaws were found to be acceptable applying the 'through-wall flaw' approach. This approach applies to the identified leak locations as well as other point locations that may not meet the minimum wall thickness requirements.

Augmented Inspection

Baseline visual inspections and periodic visual inspections of the leak repair area will be performed. Other portions of the SW system piping which are potentially susceptible to this same corrosion mechanism will undergo NDE inspection, where possible.

Repair Plan

The two identified leaks in the eighteen (18) inch pipe section will be contained by a non-Code repair once approval is obtained from the NRC. This repair will consist of installing pipe clamps and neoprene seals over each of the leak sites. The SW system water chemistry was also evaluated for impact on the proposed temporary repair, and no adverse effects are anticipated.

FPC had previously identified the gradual erosion of the suction piping run and planned for a large scale replacement of appropriate sections in the mid-cycle 9 outage scheduled for Spring 1993.

Seawater is circulated through the nuclear services heat exchangers and merged with the seawater from the decay heat closed cycle heat exchangers to the redundant 48 inch discharge pipes leading to the discharge canal. Three of the four nuclear service heat exchangers supply the full normal and emergency cooling requirements, with the fourth unit on reserve.

The services cooled by the SW System, Figure 9-8, are of a nuclear nature and, hence, segregated to this one system. The SW System serves the following equipment:

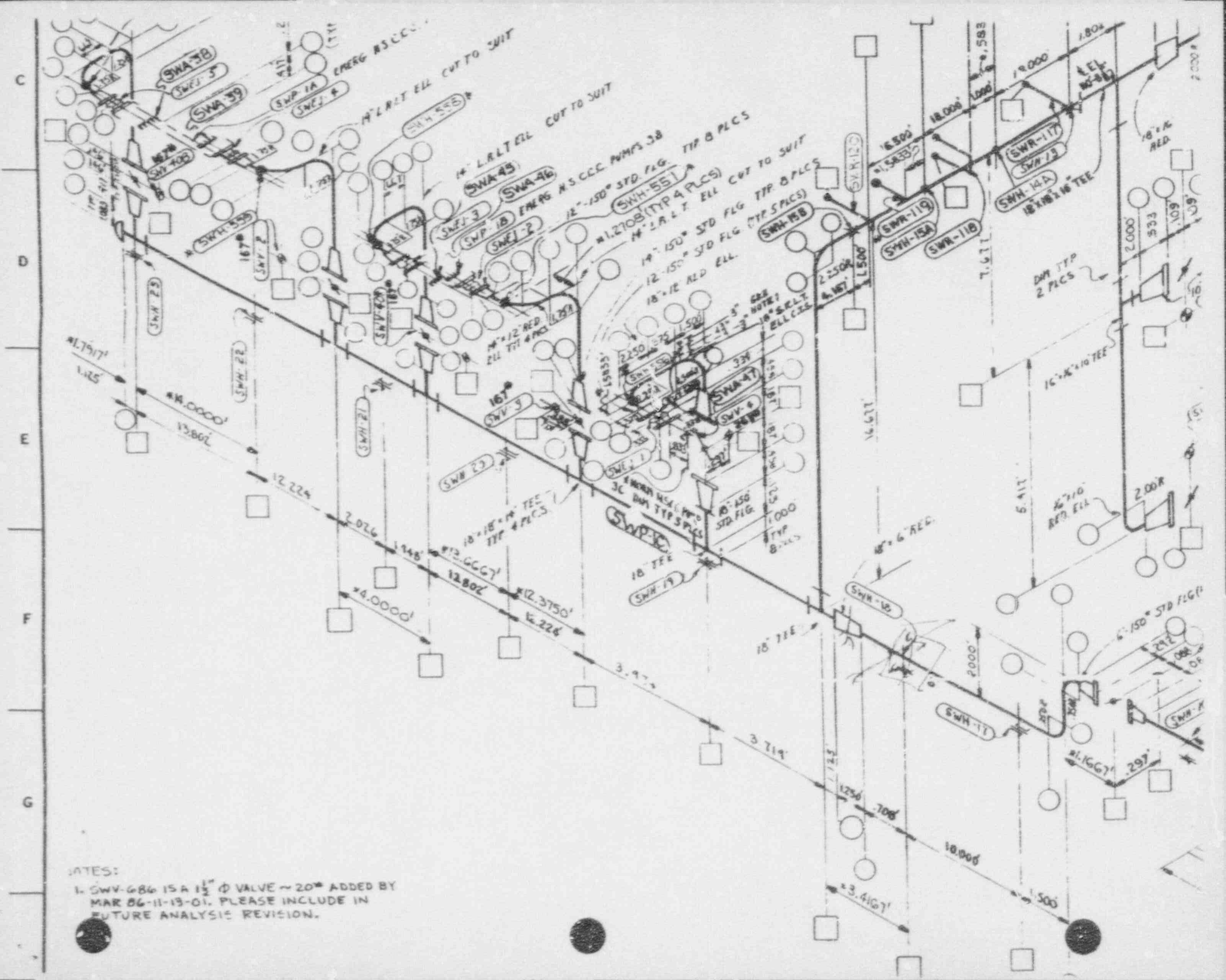
Spent fuel coolers
Spent fuel coolant pumps air handling units
* Reactor coolant pumps and motors -- air, oil, and seal area coolers
* Seal return coolers
Reactor building fan assembly cooling coils
Ventilation fan motor coolers
Makeup and purification pump and motor -- 1B
** Makeup and purification pump and motor -- 1A or 1C
* Waste evaporator and reactor coolant evaporator package coolers
* Waste gas compressors
Steam generator, pressurizer, and post accident sample coolers[1]
Chilled water system chillers
* Letdown coolers
* Reactor coolant drain tank cooler
* Control rod drive mechanism coolers and nuclear service booster pumps
Motor-driven emergency feedwater pump lube oil cooler and motor cooler
Air coolers -- Nuclear service closed cycle cooling and seawater pump motors

* Those services designated by an asterisk will be isolated on emergency safeguard signal and the closed cycle water made available to other essential services, specifically, the reactor building fan assemblies.

** MUP-1B can only be cooled by the SW System. MUP-1A and MUP-1C can be cooled by either SW or DC. MUP-1A is normally aligned to the SW System with MUP-1C aligned to the DC System.

[1] SW water is the direct coolant for the post accident sample coolers, but must be chilled prior to entering two of the three coolers. This is accomplished by another heat exchanger and the Chilled Water System. The resultant heat load on the chillers is intermittent and does not affect their capacity.

The reactor building fan assemblies are normally served by an industrial cooler. Upon activation of the Engineered Safeguard (ES) signal, the fan assemblies are automatically isolated from the industrial cooler and switched to the SW System. The heat transferred by the coolers listed above is carried away to the active nuclear service heat exchangers by the closed cycle water circulated by the nuclear service closed cycle cooling pumps. The nuclear service closed cycle cooling pumps are comprised of one 100% capacity normal duty pump and two 100% capacity emergency



NOTES:

1. SWV-686 IS A 1½" Φ VALVE ~ 20# ADDED BY MAR 86-11-13-01. PLEASE INCLUDE IN FUTURE ANALYSIS REVISION.