Florida Power
CORPORATION

Crystal River Unit 3
Docket No. 50-302

November 6, 1992
3F1192-07

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

Subject: Repair of ASME Code Class III Piping

Florida Power Corporation is hereby requesting NRC approval of a temporary non-code repair to moderate energy portions of the CR-3 Nuclear Closed Cycle Cooling (SW) system. FPC has separately filed a response to Generic Letter 90-05 which addresses the handling of such repairs and is awaiting the NRC's response prior to modifying our Repair and Replacement Program. In the meantime, we are requesting approval for this repair under the intent of the Generic Letter. A permanent repair (replacement of this and other portions of the SW system piping) is already part of the planned scope of our 9M midcycle outage scheduled for next Spring.

Should this repair not be promptly installed at this time, wall thinning could potentially increase to the degree that the SW system would become inoperable. This would require entry into Technical Specification 3.0.3 which requires prompt plant shutdown. Shutdown and permanent repair at this time would require an extended duration outage.

Sincerely,

G. L. Boldt
Vice President
Nuclear Production

GLB:BPW
Attachment

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

A047
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Temporary non-Code Repair

System and Flaw Description

The portion of the SW system affected is the 6 inch, schedule 40, section of the SW pump suction piping downstream of the surge tank and SWV-1 and adjacent to the 6 inch to 18 inch suction piping transition piece. The piping contains the treated demineralized water of the closed cycle SW system. The primary leakage location is at the interface between the seismic support "saddle" and the piping itself (see attached isometric sketch). The current leakage rate is approximately 30 drops a minute. More significantly the seismic capability of the piping could be degraded if, the corrosion is allowed to continue un-checked.

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 spool piece. 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 flaw cannot be fully characterized utilizing routine NDE methods because removal of the support "saddle" and surface preparation has a potential to increase the leakage, perhaps precluding the proposed repair method. The initial cause of the leakage is corrosion from the exterior of the piping inward. This section of the piping lies in a trough which may periodically contain standing sea water. The contact between the piping and this standing water (the corrosion is principally located on the bottom of the piping) is believed to be the cause of the corrosion. Inspection of the affected piping section with a boroscope indicated the flaw to be a pin-hole type leak. Due to the capillary action of the corrosion layer on the exterior of the pipe, the wetted area is extended and makes full characterization difficult. The wetted area is approximately an 18 inch long area on the pipe bottom.

FPC had previously identified the gradual erosion of the suction piping run and planned for a large scale replacement of appropriate sections in the next outage.

Flaw evaluation

Normally, FPC would repair isolated leaks with compression patches and evaluate the structural integrity of the flawed piping as requested by Generic Letter 90-05. This, however, is not practical in the instant case due to the location of the flaw. Thus, encapsulation is being utilized. This will add additional assurance of structural integrity. It should be noted that the SW suction piping is a very low pressure and low temperature system (100 psig design pressure and approximately 80 degrees Fahrenheit). Thus, this type of temporary repair is appropriate.

Augmented Inspection

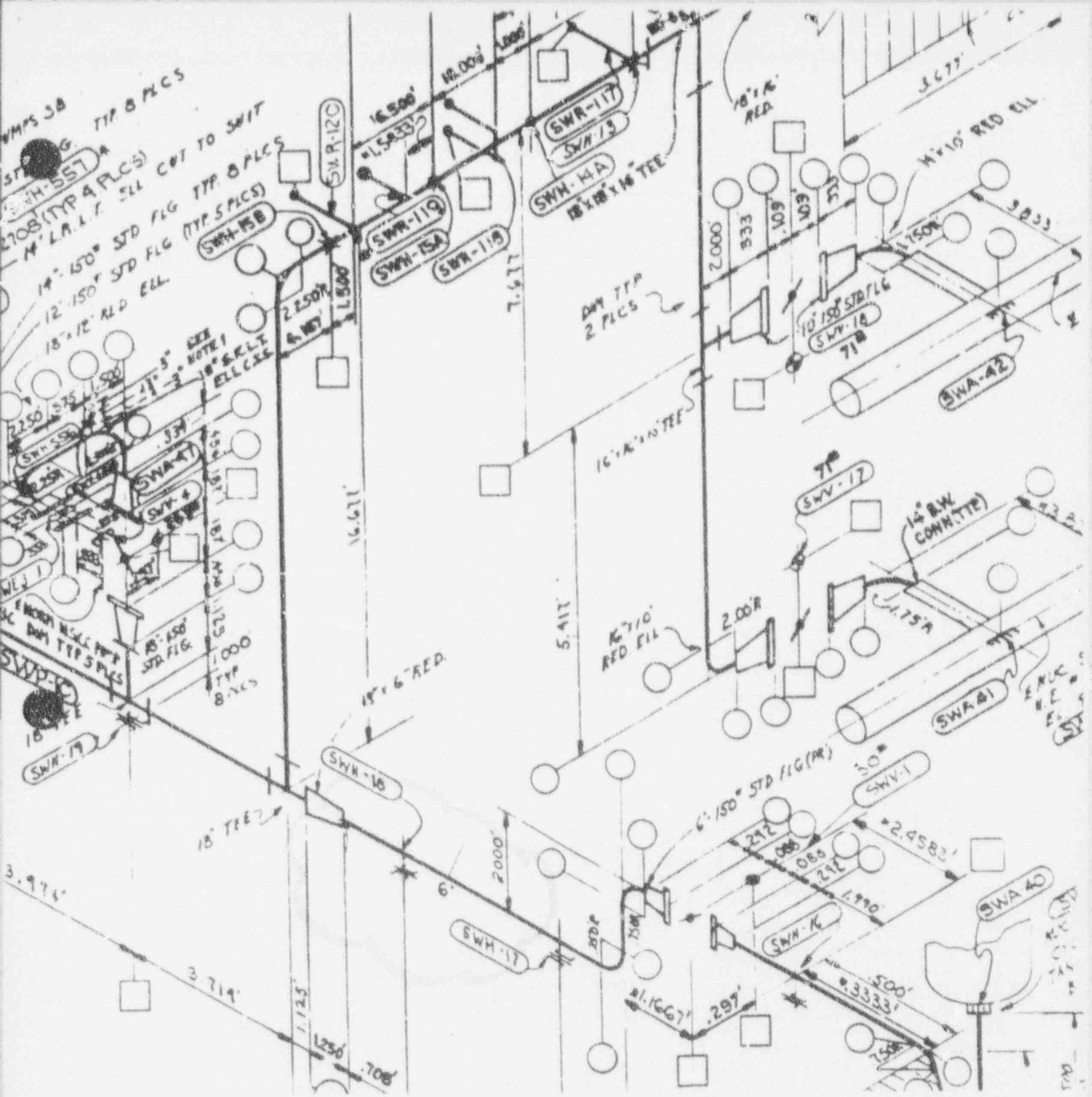
Baseline visual inspections and periodic visual inspections of the leak repair area will be performed.

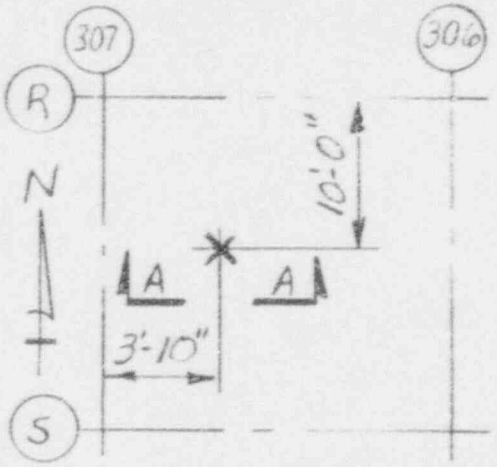
A visual inspection of the remainder of the suction piping to look for similar flaws has already been completed. This visual inspection revealed two additional pin-hole type leaks. These flaws are under evaluation, however, they are not a structural concern at this time. Repair of these flaws, if necessary, will be addressed by separate correspondence. Other portions of the SW system piping which are potentially susceptible to this same corrosion mechanism will undergo NDE inspection, where possible.

Repair Plan

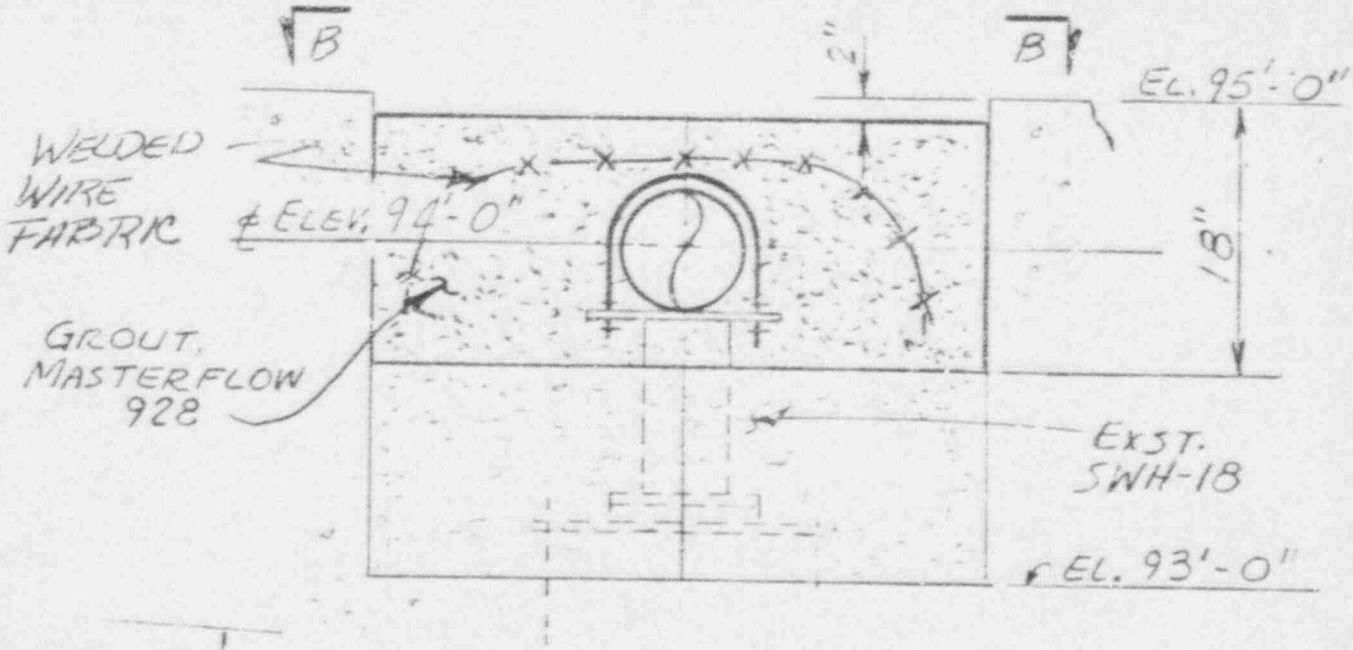
The piping spool piece will be encapsulated in high strength grout. The enclosure will restore full structural integrity in the diminished portion of the piping including features to ensure adequate protection for tensile stresses. The relatively low design pressure of this portion of the system and actual piping configuration will preclude the piping from axially separating should further erosion occur. The extent of the encapsulation will be limited as shown on the attached sketch.

SW system water chemistry was also evaluated and is not expected to cause any adverse effects. Hydrazine concentration is maintained from 15 to 25 ppm in the SW system. At this concentration, it would evaporate with no harmful effect. In the past, prior to installation of mechanical seals on the SW pumps, much greater quantities than the present leakage rate were continuously released in this area with no harmful effects.

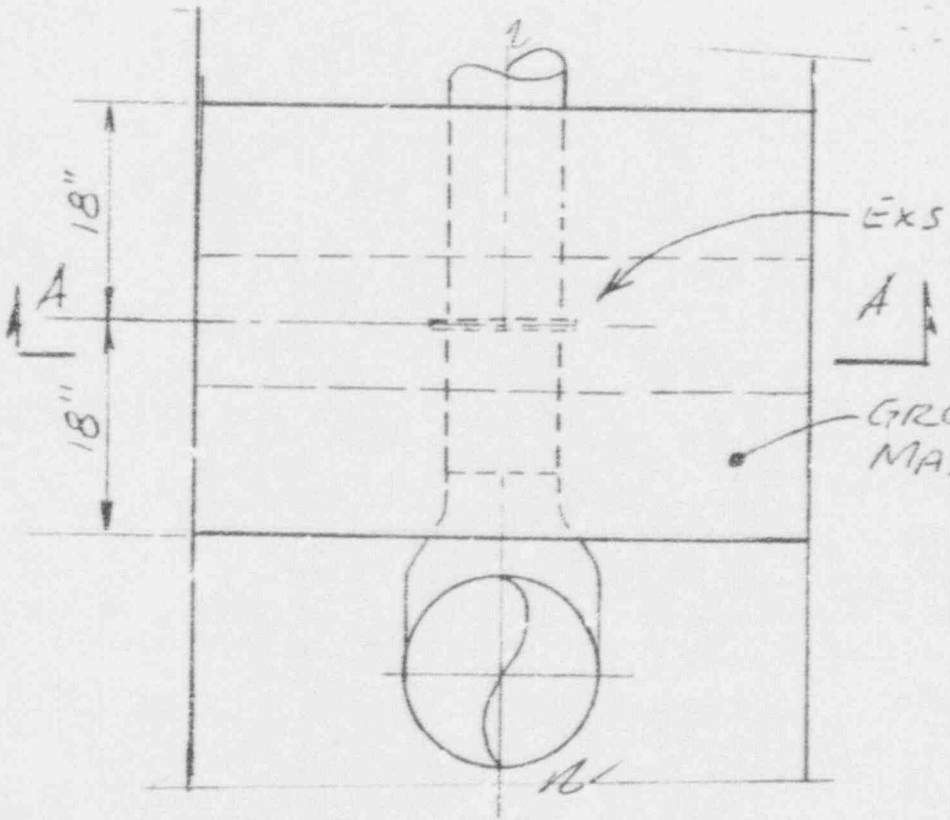

SWR-117
SWH-13
SWH-14A
SWR-119
SWH-15A
SWR-118
SWR-12C
SWH-15B
SWH-557
SWA-41
SWH-19
SWH-18
SWH-17
SWH-16
SWV-17
SWV-1
SWA-42
SWA-41
SWA-40
16"x16"x16" TEE
18"x 6" RED.
18" TEE
6"·150# STD FLG (PR)
14" B.W. CONN (TYP)
DIM TYP 2 PLCS
14"·150# STD FLG
12"·150# STD FLG (TYP 5 PLCS)
18"x12" RED ELL
16.677'
5.417'
7.677'
3.719'
2.000'
16.500'
2.250'
1.500'
.500'
.3333'
.297'
2.4583'
3.677'



LOCATION PLAN



SECTION A-A



PLAN B-B

MAR SKETCH # T92110201.1
REV. 0

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

Gilbert/Commonwealth engineers and consultants
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ROY W. ADLER
Project Manager
Nuclear Services

November 6, 1992

FCS-13441
W.O. 04-5520-005
Contract NPM009AD, WA #005
Small Account #00051

Mr. R.T. Bowles
Nuclear Project Management Engineer
Florida Power Corporation
P.O. Box 14042/C2I
St. Petersburg, Florida 33733

Attention: Mr. D. Jopling

Re: Crystal River Unit 3
Conversion of SWH-018 to
a 4-Way Restraint

Ref: WA #005, S.A. #051

Action By: N/A

Dear Mr. Bowles:

As per your request, G/C has evaluated the condition of temporarily changing the 2-way restraint at analysis node 59 (EDS-022, Support SWH-018) to a 4-way restraint by encapsulating the pipe in concrete. This temporary arrangement will have little, if any effect on the piping analysis.

The deadweight loads and stresses will not be adversely affected by this change, since the encapsulation will be supported by the building structure. Thermal loadings and stresses are not a concern, since the maximum operating temperature of this subsystem is 110°F (It is standard practice for CR3 piping analyses to analyze thermal loadings for temperatures ≥ 150°F.). Also by changing the support to a 4-way restraint, the stiffness of the piping system in the immediate area of the support will become more rigid. Thus the stresses in the immediate area of the support location will not change significantly. Note, the maximum primary stress for this analysis is 7,690 psi ≤ 18,000 psi allowable.

Gilbert/Commonwealth engineers and consultants
P.O. Box 1498, Reading, PA 19603 Tel. 215-775-2800/Fax 215-775-2870/Telex 173-228

Should you have any questions or comments, please advise.

GMJ/RFH/RWA/gmj

Very Truly Yours,

G.M. Jackson
Project Piping Engineer

R.F. Heisler
Piping Engineer

R.W. Adler
Project Manager

cc: W.W.Nisula
R.T. Bowles
D. Jopling
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FPC Records Management (CL Only)
R.W. Adler (2)