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**Florida  
Power**  
CORPORATION

January 22, 1982  
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File: 3-0-3-f

Mr. J. P. O'Reilly, Regional Administrator  
U.S. Nuclear Regulatory Commission  
Region II  
101 Marietta St., Suite 3100  
Atlanta, GA 30303



Subject: Crystal River Unit 3  
Docket No. 50-302  
Operating License No. DPR-72  
10 CFR 21 Report on Hydraulic Snubber  
Aluminum Adaptor Bushings

Dear Mr. O'Reilly:

Florida Power Corporation (FPC) has determined the subject issue to be reportable under the provisions of 10 CFR 21. Accordingly, the following information is hereby submitted.

FPC has determined from recently received information that small bore hydraulic snubbers supplied for Crystal River Unit 3 seismic restraints were installed with aluminum adaptor bushings which are defective. The aluminum bushing is an integral part of the small bore hydraulic snubbers located throughout the plant. The bushing adapts the 3/4" opening in the control valve block assembly to 1/4" tubing and a tapered steel fitting. This makes up the flow path of hydraulic fluid from the cylinder/piston assembly to the valve block. The failure (cracking) allows fluid to leak out of the snubber. With either a low fluid level or no fluid left in the snubber, it generally will not perform its primary function as a seismic restraint. (Also, the pressure retaining ability of the cylinder valve block assembly is no longer maintained.) This is evidenced by failure of the snubber to pass a functional test. Without this seismic restraint, the structural integrity of the reactor coolant system and other safety related systems may be compromised. The evidence of cracked bushings was initially noted during maintenance activities in mid-1979. The incidence has increased over the years, and an engineering investigation was initiated in early 1981. (See LER 81-054/03L-0 submitted on September 4, 1981).

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Mr. J. P. O'Reilly  
January 22, 1981  
Page 2

The small bore hydraulic snubbers with this problem were supplied by Power Piping Co. (Pipe Hanger Div; Pittsburgh, PA). The sizes vary from 1.5" X 5" (bore X stroke) to 5" X 15". The capacities range from 3,000 lb. to 49,400 lbs. These are model 1900 series snubbers. They are located throughout the unit and are on various systems. These are the only brand of small bore snubbers (both safety and non-safety) presently installed at Crystal River Unit 3.

Failure analysis reports obtained from Power Piping Co. and FPC Materials Technology reveal two possible causes of the cracking. They are:

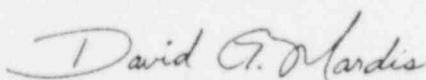
1. During original assembly, the aluminum bushing is screwed into a carbon steel valve block. A tapered carbon steel fitting is then screwed into the bushing. There is the possibility that over-torquing may have occurred during this operation. Since the aluminum and carbon steel have different coefficients of thermal expansion, additional stress could have been induced in the bushing during thermal cycling, thus leading to failure (cracking).
2. The aluminum used was 6061T6. This material is intended for use only in low temperature environments. When subjected to elevated temperatures over a period of time, the mechanical properties of the material degrade, leading to possible premature failure.

In summary, the aluminum used in the bushing was a misapplication of materials.

At this time, FPC has rebuilt all snubbers located inside the Reactor Building and replaced the aluminum bushing with a one-piece stainless steel Swagelok fitting (166 snubbers). Of the remaining 95 safety-related snubbers outside the Reactor Building, 27 have been rebuilt and bushings replaced. The balance of safety-related snubbers will be rebuilt during this year as parts become available. Power Piping Co. has also made the change from aluminum to stainless steel bushings and has informed their other customers of this recommended change-out to stainless steel.

Should you have any questions or comments, please contact this office.

Very truly yours,



David G. Mardis  
Acting Manager  
Nuclear Licensing

KP:mm

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