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SUBJECT: Forwards rev to relief request PR-12,incorporating addl info from instrument vendor,Bently NV,on range of instrument.

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P.O. Box 128, Ft. Pierce, FL 34954-0128

FPL

January 7, 1994

L-94-005
10 CFR 50.4
10 CFR 50.55a

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

RE: St. Lucie Unit 1
Docket No. 50-335
In-Service-Test Program (IST)
Second Ten-Year Interval
Relief Request(s) PR-12 and PR-13

Pursuant to 10 CFR 50.55a (a)(3), Florida Power and Light Company (FPL) requests approval of modified relief request PR-12. FPL has determined pursuant to 10 CFR 50.55a (a)(3) that the proposed alternatives would provide an acceptable level of quality and safety, and that compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. Interim relief was granted in section 2.15 of NRC Safety Evaluation Report (SER) dated January 29, 1993. The attached revision to relief request PR-12 incorporates additional information from the instrument vendor, Bently Nevada, on the range of the instrument. The modified relief request PR-12 will be incorporated into the IST Program when approved.

In addition, FPL withdraws relief request PR-13, intake cooling water pump vibration measurement instrument range relief. This relief is no longer required since FPL has determined, based on additional information from the instrument vendor, that the range of the instrument meets the requirements of the ASME Code. Interim relief was granted for PR-13 in section 2.15 of NRC SER dated January 29, 1993.

Please contact us if there are any questions about this submittal.

Very truly yours,

D. A. Sager
Vice President
St. Lucie Plant

140003

DAS/GRM/kw

cc: Stewart D. Ebneter, Regional Administrator, Region II, USNRC
Senior Resident Inspector, USNRC, St. Lucie Plant

DAS/PSL #1044-94

RELIEF REQUEST NO. PR-12

COMPONENTS:

Reactor Coolant Charging Pumps 1A, 1B, and 1C

SECTION XI REQUIREMENT:

The frequency response range of the readout system (for instrument used to measure vibration amplitude) shall be from one-half minimum speed to at least maximum pump shaft rotational speed. (IWP-4520(b))

BASIS FOR RELIEF:

The reactor coolant charging pumps operate at approximately 210-215 rpm which equates to a rotational frequency of 3.50 Hz. The one-half minimum speed frequency response required for the vibration instrumentation correlates to 1.75 Hz (105 cpm).

The vibration instrumentation presently in use at St. Lucie is the Bently Nevada model TK-81 with 270 cpm probes. The TK-81 integrator frequency response is essentially flat down to 120 cpm (cycles per minute) where the displayed output of the instrument slightly increases to approximately +1dB at 100 cpm. The -3dB frequency response is reached at approximately 54 cpm. The velocity probes used with the TK-81 are a special low frequency probe nominally rated down to 270 cpm (-3 dB). This is only slightly higher than the expected rotational (1X) speed of the charging pump (205 - 210 cpm). The 1X (205 cpm.) vibration frequency components will be somewhat attenuated by the probes, but not cut off. Overall vibration levels would still show an increasing value if some problem developed whose characteristic frequency was 1X running speed.

There are virtually no mechanical degradations where only a sub-synchronous vibration component would develop on the charging pumps. For example:

a. Oil whirl (0.38X - 0.48X) is not applicable to a horizontal, triplex, reciprocating pump.

b. A light rub / impact could generate 0.5X (102.5 cpm) vibration components, but would also usually generate a sequence of integer and half integer running speed components. A heavy rub generates increased integer values of multiple running speed components, as well as precessing the 1X phase measurement. In either case the overall vibration level would still show an increase from both the attenuated sub-synchronous and 1X vibration components as well as the higher harmonic vibration components.

c. Looseness in the power train would likely be indicated by increasing 1X and 2X vibration components. These signals would be slightly attenuated but again not completely cut off.

Based on the above information, it is our evaluation that the present use of the Bently Nevada 270 cpm probes with the portable TK-81 instrument is capable of collecting sufficiently reliable data to identify changes from baseline readings to indicate possible problems with the pumps.

ALTERNATE TESTING:

During testing of these pumps, the vibration instrumentation used will be the Bently Nevada model TK-81 with 270 cpm probes or equivalent.