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## DESCRIPTION

LTR. RE. OUR 1/10/77 LTR...TRANS THE  
FOLLOWING.....

(1P)

PLANT NAME: ST. LUCIE # 1

## ENCLOSURE

PLANS FOR ACCOMMODATING TEST REQUIREMENTS AND  
RECOMMENDATIONS CONCERNING THE FEEDWATER HAMMER  
TEST.....

(3P)

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ACKNOWLEDGED

## SAFETY

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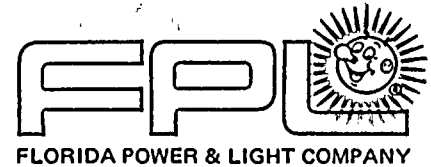
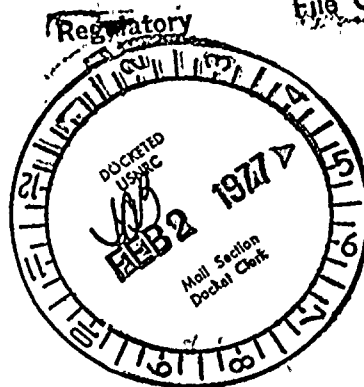
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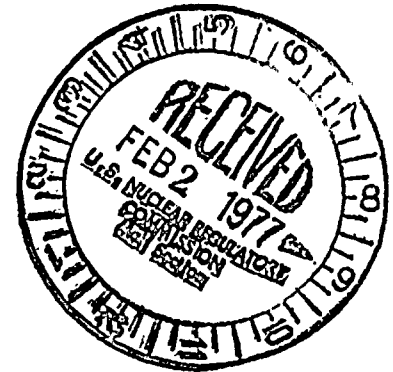


January 21, 1977  
L-77-27

Office of Nuclear Reactor Regulation  
Attention: Mr. Dennis L. Ziemann, Chief  
Operating Reactors Branch #2  
Division of Operating Reactors  
U. S. Nuclear Regulatory Commission  
Washington, D. C. 20555

Dear Mr. Ziemann:

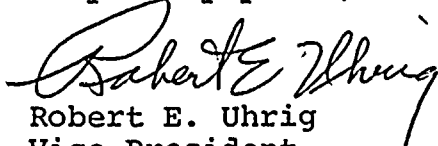
Re: St. Lucie Unit 1  
Docket No. 50-335  
Feedwater Hammer



In your letter of January 10, 1977, you established test requirements and made recommendations concerning our proposed St. Lucie Unit 1 feedwater hammer test. Our plans for accommodating your requirements and recommendations are attached.

We plan to perform the water hammer test following completion of the 80% power plateau in our power ascension testing program. By our current schedule, the test will be performed within 2-4 hours after a reactor trip from 40% power (total loss of flow-natural circulation test) sometime between January 30 and February 1, 1977. We will keep you informed as the schedule becomes more firm.

Very truly yours,

  
Robert E. Uhrig  
Vice President

REU/MAS/cpc

Attachment

cc: Mr. Norman C. Moseley, Region II  
Robert Lowenstein, Esquire

1221



## ATTACHMENT

St. Lucie Unit 1  
Docket No. 50-335  
Feedwater Hammer

### NRC REQUIREMENTS

Comment I.A, as worded, requires that the 2-hour drain period begin immediately following shutdown. However, to accommodate the NRC's desire to witness the waterhammer test, FPL plans to perform the waterhammer test in conjunction with a scheduled trip from 40% power. In order to do this, Comment I.A should be worded such that it relates only to the amount of decay heat available at the beginning of the waterhammer test. This was discussed during a January 14, 1977, telephone conference with members of the NRC staff, and it is FPL's understanding that the NRC will accept a test that conforms with the requirement that "the heat input to the primary system at the beginning of the test shall be equal to or greater than the decay heat rate generated 2 hours after a shutdown from a minimum of 30% power following a minimum of 48 hours of operation." FPL feels that the revised wording retains the intent of the initial NRC wording, and that by conducting the waterhammer test as scheduled, we can satisfy the requirements of Comment I.A.

Comment I.B will be incorporated in the test procedure by requiring that feedwater flow to the 1B steam generator be secured for 2 hours.

Comment I.C will be incorporated by revising the emergency procedure on loss of steam generator level to include a precaution not to exceed 600 gpm auxiliary feedwater flow to any steam generator when the steam generator level is below the feeding.

Comment I.D will be incorporated in the test procedure by requiring that feedwater isolation be accomplished either by securing the feedwater pumps, or by using double valve isolation.

Comment I.E, as worded, requires that auxiliary feedwater flow rates (gpm) be recorded. At St. Lucie Unit 1, there is flow indication from 0 to 300 gpm when using the motor driven auxiliary feedwater pumps. However, based on previous recommendations from the NRC staff, FPL plans to conduct the test at 600 gpm, therefore, the requirement has been modified such that the "flow rates (gpm) be calculated and documented." This also was discussed during the January 14th telephone conference and it is FPL's understanding that the revision does not change the intent of Comment I.E and is acceptable to the NRC.\*

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\*600 gpm is the maximum auxiliary feed flow expected during any operational situation and is the maximum flow rate that can be supplied to one steam generator by using two motor driven auxiliary feedwater pumps.

Estimate of the flow rate for the 600 gpm test will be made by either:

- recording motor amps and bus voltage to determine horsepower; flow rate will be determined from the manufacturer's horsepower curve.
- recording the suction and discharge pressure of the pumps; flow rate will then be determined from the manufacturer's pump head curve.

#### NRC RECOMMENDATIONS

Comment II.A discusses recording instrumentation. The instrumentation to be used in monitoring and recording test parameters is listed in Section 5.0 of the FPL feedwater hammer test procedure. FPL feels that the following recordings (in addition to audible indications) are the best indication of waterhammer:

- S/G accelerometer signals from the Loose Parts Monitor,
- S/G level  $\Delta P$  signals,
- S/G pressure signals,
- auxiliary feedwater pressure signals.

In addition, FPL has procured a 0-5000 psi pressure transmitter with a frequency response compatible with NRC recommendations and intends to mount it on the main feedwater piping outside containment.

With respect to Comment II.B, indication of auxiliary feedwater temperature at the source will be available to the NRC staff observer. However, FPL does not plan to install a temperature indicator at the inlet to the steam generator because this would require a time consuming containment entry for removal and re-installation of pipe lagging and, due to radiation exposure, could be done only with the plant shutdown. The only remaining scheduled shutdown before the 40% trip is an 80% trip which is to be followed by a rapid return to power; containment entry would not be compatible with this trip. In addition, compliance with Comment I.B should make it unnecessary to provide additional instrumentation to verify that the feedwater is drained.

#### CONCLUSION

In conclusion, considerable effort has been expended to develop a workable, useful feedwater hammer test. The current test has been developed to meet the requirements and some of the recommendations of the NRC's January 10th letter as modified by the January 14th telephone conference, and has been scheduled to satisfy the NRC's desire to witness the test. To incorporate the remaining recommendations in Comments II.B, II.C, and III would delay performance of the feedwater hammer test because



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FPL would need more time to procure and install additional instrumentation and schedule additional plant trips.

MAS/hlc  
1-21-77



