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AUTH.NAME AUTHOR AFFILIATION
UHRIG,R.E. Florida Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION
EISENHUT,D.G. Division of Licensing

SUBJECT: Provides info re results of 800826-30 test conducted to demonstrate reactor coolant pump seal design adequacy during postulated station blackout conditions.Major seal failure abnormal leakage did not occur.Results will be included in

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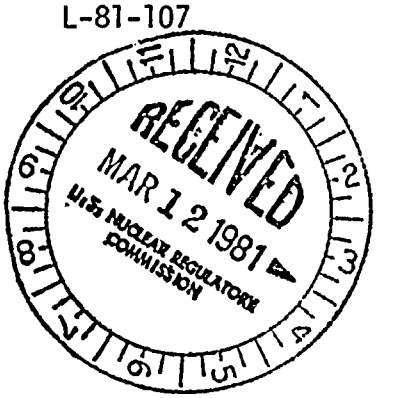

Office of Nuclear Reactor Regulation
Attention: Mr. Darrell G. Eisenhut, Director
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Eisenhut:

Re: St. Lucie Unit 2
Docket No. 50-389
Adequacy of Reactor Coolant Pump Seal Design
During Postulated Station Blackout Conditions

This letter is to report the results of Florida Power and Light Company's test of the reactor coolant pump seals used at St. Lucie Unit 2 under simulated conditions to establish their ability to withstand a station blackout event. The performance of this test has demonstrated that the design of the reactor coolant pump seals is such that no abnormal leakage should be expected to occur from these seals during a postulated loss of all AC power situation when there is no cooling water to the seal coolers.

The test was conducted at the Byron Jackson Pump Division in Los Angeles on August 26-30, 1980, utilizing an actual pump seal cartridge supplied by Florida Power and Light Company from St. Lucie Unit 2.

A test fixture was used which simulated a reactor coolant pump under hot standby conditions. All of the seal related parts were of the same material and geometrical configuration as in the actual pump. The seal cartridge related portions of this fixture, including the shaft, were made dimensionally the same as that of the reactor coolant pump. As specified, hot pressurized water was circulated in the fixture duplicating the internal flow system of the pump. The shaft was sealed at the top of the fixture using the test seal cartridge. The block-off plate or collection chamber was bolted on top of the seal cartridge in order to direct the seal leakage to a measuring system.

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Temperature detectors were placed in various locations as follows: (1) in the lower fixture chamber (location of the reactor coolant pump impeller), (2) in the upper fixture chamber (location of the seal cartridge), and (3) in the upper seal cavity (between the third and vapor seal locations). The seal cartridge pressure connections were used to read the pressure in each seal cavity, and the leakage was piped through heat exchangers to cool this flow so that it would remain a liquid to be measured with a beaker and stop watch. Since this flow exits the pump from the vapor seal, a pressure and temperature gage was placed in this line to record the vapor seal condition.

The seal cartridge was tested with water at 550°F and 2250 psig to duplicate initial conditions expected in the event of a loss of all AC power. These test conditions were maintained for more than 50 hours.

Significant seal failure did not occur during this test and, with the exception of abnormally high vapor seal temperatures and pressures, the controlled leakage was recorded within normal limits during most of the test, although this leakage was two phase flow as determined from the high temperature readings of the water in the upper seal cavity. The maximum seal leakage recorded was 16.1 gph.

The seal cartridge was disassembled and inspected after the test. All pressure containing housings and the seal sleeves were still within the drawing tolerances. Seal damage included a broken vapor seal rotating fact ring, permanent compression of all O-rings, permanent hardening of all U-cups, a slight out-of-round condition in the U-cup followers and the spring holders, and slight distortion of all lapped surfaces.

In conclusion, this severe test demonstrated the capability of a reactor coolant pump seal used at St. Lucie Unit 2 to withstand conditions far in excess of the environment encountered in any hypothetical station blackout event.

As requested in Mr. Robert L. Baer's letter of September 17, 1979, the results of this test will be included in the Final Safety Analysis Report for St. Lucie Unit 2.

If there are any questions concerning this test, please contact us.

Very truly yours,

Robert E. Uhrig

Robert E. Uhrig
Vice President
Advanced Systems & Technology

REU/TCG/mc

cc: J. P. O'Reilly, Director, Region II
Harold F. Reis, Esquire

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