



November 1, 1989 3F1189-02

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

Subject: Crystal River Unit 3 Docket No. 50-302 Operating License No. DPR-72 Decay Heat Pump Test and Inspection Supplemental Information

Dear Sir:

Florida Power Corporation (FPC) is submitting this letter as resolution of decay heat pump operation at low flowrates. This letter fulfills the commitment made in FPC's letter dated June 15, 1989.

In the NRC/FPC meeting on August 17, 1989 to discuss the Decay Heat (DH) Pump test report with representatives of the Mechanical Engineering Branch and their pump consultants, FPC agreed to better establish an operating duration for the decay heat pumps in the low flowrate region. It was agreed that FPC would:

- Establish a realistic DH pump low flow operating time limit necessary to bring the plant to a safe condition, and
- If this time is greater than the 10 hour pump test, FPC would provide additional justification for the time beyond 10 hours or perform additional pump testing.

The April 1989 pump test criteria was developed based upon a B&W "licensing basis" calculational model for the DH pump minimum flow requirements necessary to mitigate a 0.007 ft<sup>2</sup> SBLOCA. FPC's June 12, 1989 letter discusses the details of the analytical assumptions. FPC has subsequently used the PowerSafety International Simulator as a tool to quantify the pump operating time. The simulator allows FPC to assess the overall effects of system thermal-hydraulic performance and operator actions taken based upon existing procedures during the SBLOCA transient to

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reduce RCS pressure and temperature. The simulator run was real time beginning with a 0.007 ft<sup>2</sup> cold leg break. It used realistic assumptions regarding equipment availability and operator actions.

A comparison of the assumptions used for the criginal analytical model upon which the 10 hour test was performed and the simulator model follows:

## Original

## Simulator

of operating pumps

Loss of Offsite Power	No Loss of Offsite Power
Failure of one emergency diesel	Both diesels available
One HPI pump and one LPI pump	One HPI pump, both LPI pumps
Operator action at 10 min. to increase HPI flow and at 30 min. to depressurize OTSG	Operator action as necessary based on symptoms
BWST depletion rate equal to 2 HPI pumps	BWST depletion rate equal to "actual" flowrates

The results of the simulator run have been evaluated by B&W. The entire transient took less than 10 hours from RCS break to establishment of long term core cooling by the DH System. This time is significantly less than the original 72 hours assumed as bounding by FPC in its earlier letter. The primary purpose for the simulator run was to determine the flowrates and the time at the various flowrates for DH pump operation. The simulator results are:

Flow Range (gpm)	Time - Simulator
≥ 1500	2 hours 43 min.
$400 \le flow < 1500 < 400$	43 min. 31 min.

The original analytical model showed that the DH pumps would operate in the 400 to 1500 gpm range for 5 hours. The 10 hour test period was selected for conservatism. The simulator transient results in the pump operating for less than 1 hour in the 400 to 1500 gpm range. Therefore, FPC concludes the expected DH pump operation during a SBLOCA will remain within the 10 hour test duration. November 1, 1989 3F1189-02 Page 3

The DH pump test and the conclusions presented in the test report submitted in FPC's July 11, 1989 letter have been substantiated by this simulator evaluation. The results of the simulator evaluation show the basis for the 10 hour pump test period was adequate to establish pump operability. The performance of the CR-3 decay heat pump during the 10 hour test period was more than adequate to demonstrate that the operation at flowrates less than recommended by Dresser Industries is acceptable. FPC concludes the CR-3 decay heat pumps will operate satisfactorily throughout the expected flow range and no further testing or analyses are planned.

Sincerely,

Rolf C. Widell, Director Nuclear Operations Site Support

RCW/JWT/sdr

xc: Regional Administrator, Region II Senior Resident Inspector