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ACCESSION NBR: 8211090518 DOC. DATE: 82/11/04 NOTARIZED: NO
 FACIL: 50-389 St, Lucie Plant, Unit 2, Florida Power & Light Co.
 AUTH. NAME: UHRIG, R. E. AUTHOR AFFILIATION: Florida Power & Light Co.
 RECIP. NAME: EISENHUT, D. G. RECIPIENT AFFILIATION: Division of Licensing

DOCKET #
05000389

SUBJECT: Forwards operating procedure guidelines for detection of boron dilution, supplementing 821029 ltr describing interim measures to detect occurrences of inadvertent boron dilution until alarm sys is installed on late 1983.

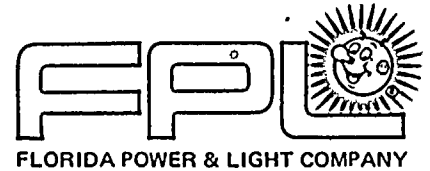
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November 4, 1982
L-82-487

Office of Nuclear Reactor Regulations
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 No. 2
Docket No. 50-389
Boron Dilution System Alarm

On October 29, 1982, Florida Power and Light submitted a response to the NRC staff request for information on boron dilution alarms (FPL letter L-82-472). In this letter, FPL committed to the installation of redundant boron dilution alarms and provided a description of the interim measures which would be employed to detect occurrences of inadvertent boron dilution until the alarm system is installed (late 1983).

As requested by the NRC staff reviewer, the attached procedure provides operator guidelines to supplement and clarify the monitoring frequencies required to detect an inadvertent boron dilution event.

If you have any questions regarding this submittal, please contact us accordingly.

Very truly yours,

Robert E. Uhrig
Vice President
Advanced Systems and Technology

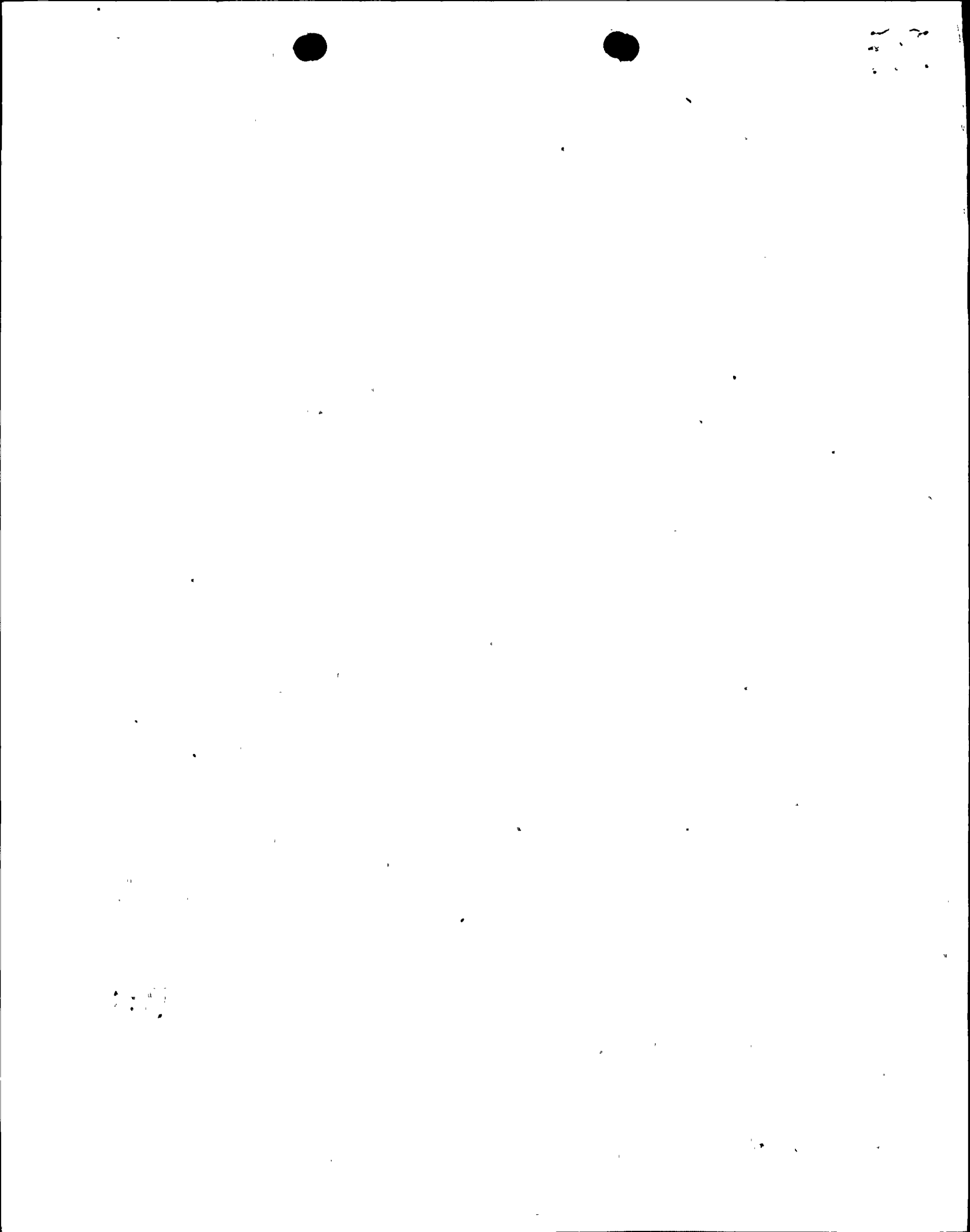
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Attachment

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

Boo!

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Operating Procedure Guidelines for Detection of Boron Dilution

1. To assure detection of a boron dilution event in MODES 3, 4, and 5, both of the following monitoring procedures (a and b) should be performed at the applicable monitoring frequency given in Table 1. Monitoring frequencies are based on the mode of operation and the number of charging pumps operating.
 - a. The operator shall observe the count rate indicated by the source range flux channels when entering MODES 3, 4, or 5. From that time, the flux count rate shall be observed at the applicable monitoring frequency for the duration of plant operation in the given operational mode.

Basis: As the boron concentration decreases during a dilution event, the flux count rate increases. By monitoring the startup channels at the frequencies given in Table 1, the operator will observe the flux increase resulting from any dilution event in MODES 3, 4, or 5 and have at least 15 minutes to terminate the event.

- b. The operator shall determine the RCS boron concentration when entering MODES 3, 4, or 5. From that time, the RCS boron concentration shall be determined at the applicable monitoring frequency for the duration of plant operation in the given operational mode. The boron concentration shall be determined by either of the following two methods:
 1. Monitor the boronmeter control room readout and assure the availability of the boronmeter by performing the following:
 - a) Ensure that there is letdown flow by monitoring the letdown flowmeter, FIA 2202 (P&ID E-13172-310-120,R10).
 - b) Ensure that there is flow through the boronmeter by monitoring the downstream flowmeter in the boronmeter line, FIA 2203 (P&ID E-13172-310-120,R10).
 - c) Check the boronmeter calibration by comparing the boronmeter readout with the known RCS boron concentration as verified by daily sample analysis.
 2. Perform an RCS boron concentration sample analysis.

Basis: By periodically monitoring the RCS boron concentration with the boronmeter, the operator will observe a decrease in boron concentration during a dilution event and have sufficient time to terminate the event. The boronmeter's delay time and associated uncertainties do not prevent detection by this method.



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If the boronometer is out of service or there is no letdown flow, the boron concentration can be determined by RCS sampling. This allows some flexibility while still maintaining the redundancy necessary to assure detection of an inadvertent dilution.

2. If the RCS is drained significantly in MODE 5 to allow repairs such as reactor coolant pump seal replacement, only one charging pump shall be allowed in operation. In addition, the monitoring frequency applied should be 0.5 hr. (30 minutes), as shown in Table 1, until the RCS is refilled. The analysis for this plant condition conservatively assumed water volume only in the reactor vessel up to the lower lip of the outlet nozzle.
3. In MODE 6, the manual isolation valve in the reactor makeup water line (V2183, P&ID E-13172-310-121, R10) should remain locked closed at all times. If this valve must be opened to allow filling of the refueling water tank (RWT), it should be assured that Valves V2512, V2525, and V2504 are closed and remain closed whenever the isolation valve is opened. In addition, valves V2180 and V2546 (P&ID E-13172-310-121, R10) should be locked closed at all times in MODE 6. However, V2546 is required to be open if the above RWT fill is desired during MODE 6.

Basis: In the refueling mode, there should be no need for dilution of the RCS. By locking closed the reactor makeup water isolation valve, a boron dilution event is precluded. During refueling, it may become necessary to fill the RWT by opening the reactor makeup water isolation valve and pumping blended makeup solution to the RWT. By assuring that valves V2512, V2525, V2504 and V2180 are closed, a boron dilution event can be precluded under the above plant conditions.

TABLE 1

MONITORING FREQUENCIES FOR BACKUP BORON DILUTION DETECTION
FOR ST. LUCIE 2

OPERATIONAL MODE	NUMBER OF CHARGING PUMPS			
	0	1	2	3
3 (Hot Standby)	12 hrs.	4 hrs. **(384 min)	2 hrs. (142 min)	1 hr. (128 min)
4 (Hot Shutdown)	12 hrs.	4 hrs. (427 min)	2 hrs. (213 min)	1 hr. (142 min)
5 (Cold Shutdown)	8 hrs.	1 hr. (162 min)	0.5 hr. (81 min)	0.5 hr. (54 min)
5 (Cold Shutdown with system drained down for repairs)	8 hrs.	0.5 hr. (71 min)	Operation not allowed (35 min)	Operation not allowed (17 min)
6* (Refueling)	24 hrs.	4 hrs. (688 min)	2 hrs. (334 min)	1 hr. (222 min)

*During refueling the LPSI pumps should be used for makeup operations. If it is necessary to use the charging pumps, the appropriate monitoring frequency above should be used.

**The numbers in parenthesis included in the above table represent the number of minutes from initiation of dilution until $K_{eff} = 1$. These numbers do not appear in St. Lucie 2 Tech Specs.

