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ACCESSION NBR: 8203240193 DOC. DATE: 82/03/18 NOTARIZED: NO DOCKET #
 FACIL: 50-335 St. Lucie Plant, Unit 1, Florida Power & Light Co. 05000335
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 UHRIG, R.E. Florida Power & Light Co.
 RECIPIENT AFFILIATION
 CLARK, R.A. Operating Reactors Branch 3

SUBJECT: Advises that CV-2 undervoltage relay to be installed although probability of operating for significant time period during undervoltage condition small.

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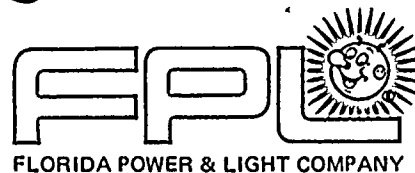
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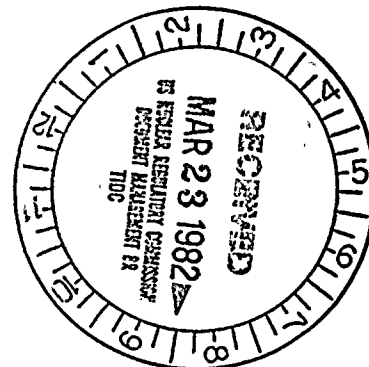
Dear Professor [Name]:

I am writing to you regarding the [topic] of your recent paper. I have read your work with great interest and find it very informative. I am particularly impressed by the [specific detail]. I would like to discuss this further and perhaps collaborate on some future work. Please let me know if you are available for a meeting.



March 18, 1982
L-82-105

Office of Nuclear Reactor Regulation
Attention: Mr. Robert A. Clark, Chief
Operating Reactors Branch #3
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555



Dear Mr. Clark:

Re: St. Lucie Unit 1
Docket No. 50-335
Degraded Grid Voltage

Florida Power & Light has reviewed the NRC letter, dated November 30, 1981, concerning degraded grid voltage at St. Lucie Unit 1. We have studied the NRC information and Technical Specification request as it pertains to our grid stability and power distribution operating practices. As described in the attached response, the probability of operating for any significant time period during an undervoltage condition is small and therefore does not warrant additional bus undervoltage protection. However, we will install a second CV-2 undervoltage relay as requested in the referenced NRC letter.

In order to preclude a severe undervoltage condition, either momentary or sustained, we have provided undervoltage protection for the 480 V buses as described in the attached response.

Very truly yours,

Robert E. Uhrig
Robert E. Uhrig
Vice President
Advanced Systems & Technology

REU/PLP/mbd

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

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In response to NRC letter dated November 30, 1981

RE: Degraded Grid Voltage - St. Lucie Unit #1

- References:
- 1) FPL - R.E. Uhrig letter, L-79 of 11/9/79 to NRC
Mr. Gammil
 - 2) FPL - R.E. Uhrig letter L-80-304 of 9/12/80 to NRC
Mr. Eisenhut
 - 3) FPL - R.E. Uhrig letter L-80-212 of 7/3/81 to NRC
Mr. Clark
 - 4) NRC - R.A. Clark letter of 11/30/81 to FPL - R.E. Uhrig

FPL's letter of 11/9/79 (reference 1) provided our operating experience that an undervoltage condition at a level which would preclude proper equipment operation has an extremely low probability. Voltage conditions in the grid system less than 230 KV are shown by experience to be short term and transient in nature with recovery or collapse of the system expected to occur in a short time period. If a general system voltage reduction were initiated, it would be accomplished at the distribution level and not by a reduction of plant output voltage. Thus, the only probable undervoltage conditions which can exist will be transient in nature, i.e., the voltage will either completely collapse or recover within a short period. Prolonged operations at lower voltage conditions are not practical. Thus operation of the undervoltage relays on the safety related buses is precluded by grid practices.

The above notwithstanding, an additional level of undervoltage protection as discussed in FPL's 11/9/79 letter (reference 1), was added to the 480V buses during the last refueling outage (October, 1981). This further assures that, in the unlikely event of a sustained degraded grid voltage concurrent with a safeguard signal, the manufacturer's guaranteed rating of the Motor Control Center contactors (the most limiting equipment) is not exceeded. The modification added an undervoltage relay to each of the safety related 480 volt load centers. When actuated, after a short time delay, it will strip the bus, start diesel generator and sequence the loads on the effected train. Since there does not exist any electrical or mechanical intertie between buses, the bus shedding and load sequencing in one bus will not affect the other. Approximately 0.2 second after the diesel generator has started and its breaker has closed, the undervoltage relays are bypassed. They remain so until the diesel breakers open, at which time they are reinstated.

Response to NRC letter dated 11/30/81
RE: Degraded Grid Voltage - St. Lucie Unit #1
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A testing circuit has been engineered into the undervoltage relay logic to provide the capability of functionally testing the undervoltage relays. A similar test circuit exists in the 4 KV safety related bus undervoltage protection logic utilizing the Westinghouse CV-2 relays.

In reference 2, it was stated that the addition of the undervoltage relays in the safety related 480 V buses will ensure sufficient voltage to meet the manufacturer's guaranteed pickup point of the most limiting piece of equipment, the motor control center contactors. A setpoint of 429 volts with a 1 second delay has been chosen. The 1 second time delay is to prevent false actuation which may be caused by relay chattering. This setpoint assures the MCC voltage will be above the manufacturer's guaranteed pick-up voltage in case of a safeguard actuation and adequately protects the equipment from starting during an unlikely sustained degraded voltage condition.

Due to independence and redundancy (see reference 3), the undervoltage protection logic of the 4160 and 480 volt buses provides protection against spurious trips of the Class 1E buses from off-site power. Furthermore, in order to prevent tripping of any safety related power train from its offsite power source due to spurious actuation or failure of a single CV-2 undervoltage relay as suggested in reference 4, a design modification is in progress to add an undervoltage relay to each of the 4160 volt buses. The new relay will parallel the existing undervoltage relays with their normally-closed contacts series connected. This modification is expected to be installed during the next scheduled refueling outage in 1983.

