NRC FORM 195 (2-70)

U.S. NUCLEAR REGULATORY COMMISSION

DOCKET NUMBER 50-335

FILE NUMBER

NRC DISTRIBUTION FOR PART 50 DOCKET MATERIAL

TO:	FROM:	DATE OF DOCUMENT
Mr. Don K. Davis	Florida Power & Light Company Miami, Florida Robert E. Uhrig	7/25/77
		DATE RECEIVED 7/27/77

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DESCRIPTION

RE our ltr 6-3-77

DISTRIBUTION OF MATERIAL CONCERNING DIESEL ALARM CIRCUITRY FOR DEESEL GENERATORS.

PLANT NAME: St. Lucie Unit No. 1

RJL 7/28/77 (1-P)

ENCLOSURE

Consists of response to NRC request for information regarding Emergency Power Systems....

DO NOT REMOVE

(2-P) ACKNOWLEDGED

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ACRS 16 CYS ANNOUNCEMENT	AS CAT. "B"		60

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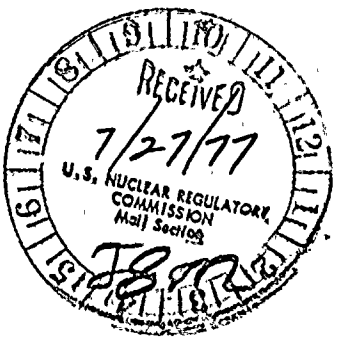
P. O. BOX 013100, MIAMI, FL 33101

FLORIDA POWER & LIGHT COMPANY

July 25, 1977
L-77-233

Regulatory File Cy.



Office of Nuclear Reactor Regulation
Attention: Mr. Don K. Davis, Acting Chief
Operating Reactors Branch #2
Division of Operating Reactors
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Davis:

Re: St. Lucie Unit 1
Docket No. 50-335
Emergency Power Systems

Your letter of June 3, 1977 transmitted the Staff's Safety Evaluation and its position relative to emergency power systems for operating reactors and requested that we review the St. Lucie Unit 1 design against the Staff's positions. These positions are based on the results of a generic review of operating reactors and not on a St. Lucie plant specific design and operating practices review. Nonetheless, the discussion that follows is responsive to your request.

Very truly yours,

Robert E. Uhrig
Vice President

REU/MAS/cpc

Attachment

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

ATTACHMENT

Re: St. Lucie Unit 1
Docket No. 50-335
Emergency Power Systems

During normal startup and shutdown evolutions, auxiliary loads at the facility are supplied by the start-up transformer when the unit is below about 170 MWe and from the station auxiliary transformer when the unit is above about 170 MWe. The start-up transformer is supplied from the grid via the station's switchyard where voltage normally swings from 238 to 242 KV. Our operating practices, which are confirmed by operating history, would not allow any sustained operation of the switchyard below about 228 KV. It should also be noted that the start-up transformer only supplies auxiliary power for a small fraction of the unit's time at power.

With regard to the auxiliary transformer, it is connected directly to the station generator. To avoid damage to the generator, a maximum variation of ± 5% of the nominal 22 KV generator voltage must be maintained. Thus, operating practices limit the voltage available to power the auxiliary transformer from 23.1 to 20.9 KV.

Auxiliary bus voltages have been calculated for the low voltage conditions of 20.9 KV for the auxiliary transformer and 228 KV for the start-up transformer. The results follow:

		AUXILIARY TRANSFORMER NOMINAL VOLTAGE	CALCULATED VOLTAGE	% OF NOMINAL
4 KV bus	1A2-1A3	4160	4002	96%
480 V bus	1A2	480	441	92%
MCC bus	1A5-1A8	480	436	91%

		START-UP TRANSFORMER NOMINAL VOLTAGE	CALCULATED VOLTAGE	% OF NOMINAL
4 KV bus	1A2-1A3	4160	3935	95%
480 V bus	1A2	480	433	90%
MCC bus	1A5-1A8	480	429	89%

Minimum acceptable bus voltages are established by the design parameters of the various connected devices and equipment; the 4 KV motors are designed to operate at 86% of 4160 volts; the 480 volt motors have also been designed for operation at 86% of 480 volts; relays, motor control center contactors, and other auxiliary devices are designed for a minimum of 85% of their nominal voltage. Normal plant operating practices developed in light of the above ensure that the minimum voltages on the auxiliary power system are above that required for the proper operation of safety and non-safety related equipment.

Undervoltage relaying is provided for the 4.16 KV bus via induction disc type relays with inversely related time and voltage. That is, the lower the bus voltage, the faster the relay responds, thereby providing protection against sustained low voltage conditions as well as complete loss of power. (The relay responds rapidly to complete loss of power and much slower to low voltage conditions.) The relay's time response provides protection against spurious trips due to motor starting and other transient conditions. The function of these relays is to initiate switchover to the diesels upon loss of offsite power.

The relay design complies with the single failure criterion. Each safety related 4.16 KV bus has an individual undervoltage relay and logic circuitry. That is, there is no intertie between the A and B undervoltage bus stripping logic. Should a relay malfunction occur it would only affect one bus; the other bus would remain connected to the offsite power source.

Approximately 0.2 seconds after the diesel generator breakers are closed, the 4.16 KV bus undervoltage relays are bypassed. When the diesel generator breaker is opened, the undervoltage relay and load shedding logic is reactivated.

If the diesel is started as a result of an SIAS, CIS, CSAS or loss of offsite power, all but two diesel generator lockout signals are overridden. Those which remain functional are "engine overspeed" and "generator differential". This reduces the probability of spuriously tripping a diesel generator when it may be required for shutdown of the plant or for mitigating the consequences of an accident. Retaining the engine overspeed and generator differential lockouts reduces the probability of seriously damaging a diesel, thus the lockouts permit diesel repair and return to service during an accident or loss of offsite power condition. These engine trips cause generator lockout thereby precluding auto restart.

The St. Lucie Unit 1 Operating License is based on the NRC's Standard Technical Specifications which require appropriate limiting conditions for operation and surveillance. These requirements are currently incorporated in the unit's technical specifications.

In summary, our review of the potential sustained degraded voltage condition indicates that the St. Lucie Unit 1 design and operating procedures acceptably address the Staff's concern. We do not believe that substantial additional protection of public health and safety will result from any modification to the facility.