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FACIL:50-250 Turkey Point Plant, Unit 3, Florida Power and Light C 05000250
50-251 Turkey Point Plant, Unit 4, Florida Power and Light C 05000251
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UHRIG,R.E. Florida Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION
VARGA,S.A. Operating Reactors Branch 1

SUBJECT: Forwards responses to questions re adequacy of station electric distribution sys voltages,per 820809 telcon Explanation of compliance w/General Design Criteria 17 encl.

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FLORIDA POWER & LIGHT COMPANY

September 1, 1982
L-82-389

Office of Nuclear Reactor Regulation
Attention: Mr. S.A. Varga, Chief
Operating Reactors Branch #1
Division of Operating Reactors
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Varga:

Re: Turkey Point Units 3 & 4
Docket Nos. 50-250 and 50-251
Adequacy of Station Electric
Distribution System Voltages

Attached are responses to NRC questions received in a telephone conference on August 9, 1982 and later telecopied to Florida Power & Light on August 10, 1982. The "Clarification Items" listed in the telecopy are repeated for convenience in reviewing. Also attached is an explanation of Turkey Point Units 3 & 4 compliance with GDC 17, as requested by the NRC.

During the telephone conference the subject of diesel generator testing was also raised. Specifically we were asked if our proposed Technical Specifications included the 18 month surveillance test to verify: "that on diesel generator trip, the loads are shed from the emergency busses and the diesel re-starts on the auto-start signal, the emergency busses are energized with permanently connected loads, the auto-connected emergency loads are energized through the load sequencer and the diesel operates for $\geq$ 5 minutes while its generator is loaded with the emergency loads."

This requirement was included in the original June 3, 1977 NRC letter on this subject. The standard Technical Specification has changed since that time to require: "verifying that on a simulated loss of the diesel generator, with offsite power not available, the loads are shed from the emergency busses and that subsequent loading of the diesel generator is in accordance with design requirements."

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We do not see the need to add this requirement because of the specific design of the undervoltage logic at Turkey Point. Our present Technical Specifications (4.8.1.c.4) requires us to simulate a loss of offsite power and to verify that the Diesel Generator starts and loads. We then simulate a safety injection signal and verify that safety loads are sequenced. By conducting this test we test all the components which would be tested by the NRC suggested specification. The only difference is the initiating event of the tests. For our present test, the startup transformer breaker is opened to simulate a loss of offsite power. To perform the NRC suggested test the Diesel Generator Breaker would be opened. From this point on the same

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components would be tested. Because this testing must be conducted with both units off line, this test would lengthen the time off line without accomplishing a significant safety purpose.

Should you or your staff have any additional questions on this subject, please contact us.

Very truly yours,

Robert E. Uhrig

Robert E. Uhrig
Vice President
Advanced Systems & Technology

REU/PLP/mbd

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

ATTACHMENT

Re: Turkey Point Units 3 & 4
Docket Nos. 50-250 and 50-251
Adequacy of Station Electric Distribution System Voltages

Item 1: Verification analysis which demonstrates that the selected voltage/time setpoints with tolerances of the undervoltage relays will provide protection to all Class 1E equipment and minimize the effects of short duration transients.

Response: All inverse time relay voltage setpoints were selected to reflect equipment minimum terminal voltages at which the equipment would operate continuously. All tolerance is on the plus side for conservatism. The thirty minute, plus or minus ten minutes, delay was chosen to 1) assure the relays just begin to operate at this voltage, thus avoiding nuisance relay action when the voltage was near the setpoint, but otherwise acceptable, 2) avoid unnecessary disconnection from offsite power due to short duration transients, and 3) avoid undue hardship in calibration. The relays on the 4kV busses protect running equipment on those busses. The relays on the 480 V load centers protect running equipment on the load centers and motor control centers connected to them. All voltage drops between the relay sensing point and equipment terminals were considered.

The voltage setpoints for the instantaneous relays located on the 480 V load centers were chosen to reflect the motor terminal minimum voltages at which the motors were guaranteed to start and run the connected loads. All tolerance is on the plus side for conservatism. These relays are intended to protect the motors that start on a safety injection actuation and are therefore interlocked appropriately. In order to prevent short duration transients from causing unnecessary separation from offsite power, a fixed time delay is also included.

Item 2: Technical specification changes for the design modifications including setpoints (voltage and time) with tolerances, surveillance requirements and limiting conditions for operation (including action statements).

Response: The proposed Technical Specification changes were submitted in FPL letter L-82-334 dated August 6, 1982.

Item 3: Verification that the time delay selected for the undervoltage relays does not exceed the maximum time delay assumed in the FSAR Accident Analysis for providing cooling to the core.

Response: The FSAR accident analysis assumed safety injection occurs 50 seconds after initiation of the accident. The safety injection pumps are loaded onto the emergency diesel generator 18 seconds after completion of the undervoltage or loss of voltage logic.

The time delay selected for the undervoltage relays that protect starting of safety motors in 10 seconds. Thus core cooling is assured in less than 50 seconds after initiation of the accident.

Item 4: Verification that the design modifications meet all requirements of IEEE-STD-279-1971 (Independence, testability, single failure).

Response: Each 4kV bus has a pair of inverse time undervoltage relays. Each 480 V load center has a pair of instantaneous undervoltage relays and a pair of inverse time undervoltage relays. Actuation of two out of two of any pair of relays (with appropriate delays and interlocks) will initiate load shedding, emergency diesel generator starting, and load sequencing on the associated train. A single failure of any one device will affect only one train. Each train is totally independent of the other. All design and installation is considered nuclear safety related and treated in accordance with our Quality Procedures.

Capability for sensor checks, functional tests and calibration are provided. Bypass during test, (provided by a key-locked spring return to normal test switch) is annunciated in the control room. No means for channel bypass, other than above test, is provided. The entire scheme is protection grade, with no control system interaction possible.

Item 5: Details on how the load shedding feature of the 480 volt load center protective relays will be bypassed when the diesel generators are supplying the Class 1E busses and reinstatement of this feature on a diesel generator trip (include latest inverse time relays also).

Response: All undervoltage relays are disconnected from the load shedding scheme when the emergency diesel generators are powering the 4kV busses. This is accomplished by an auxiliary contact on the emergency diesel generator 4kV breaker. Upon a diesel trip, the breaker opens and reinstates the bypass.

Item 6: The proposed undervoltage relays on the 480 volt Class 1E load centers are interlocked with an SI signal and therefore provides no protection for the Class 1E equipment under non-accident conditions. We require that the design be modified to provide protection under accident and non-accident conditions. The licensee shall submit design modification details which provide protection to all 480 volt Class 1E equipment under all conditions. (Include latest proposed relays).

Response: There are now proposed two sets of undervoltage relays on each 480 V load center. One set, the instantaneous relays, are interlocked with the safety injection signal and are intended to protect safety motors starting during accident conditions. The other set, the inverse time relays, are not interlocked with the safety injection signal. These relays provide protection to equipment, running and starting, under accident or non-accident conditions.

Turkey Point Units 3 & 4 Compliance with General Design Criterion 17

Turkey Point Units 3 & 4 were designed, constructed, and licensed prior to issue of the present General Design Criteria. The criterion for emergency power for Engineered Safety Features at Turkey Point is stated at FSAR Section 8.1.1 along with a discussion of compliance.

The above notwithstanding, Turkey Point Units 3 & 4 do in fact comply with the present GDC 17. Both an onsite and offsite power system, each of sufficient capacity and capability to meet the requirements specified in the criterion, are provided. The onsite power supply and distirbution system consists of two redundant trains of emergency diesel generator and associated switchgear, transformers, etc., each having suitable testability to assure performance of their safety functions assuming a single failure. Electric power from the transmission network is supplied by seven 240 kV circuits with a capacity of 540 MVA each. A common switchyard connects the transmission network to the plant electrical systems.

Normally, power for the on site distribution system is obtained via the unit auxiliary transformer which is connected to the unit's generator bus. Upon a loss of coolant accident, the units' start-up transformer is immediately available to assure that core cooling, containment integrity, and other vital functions are maintained. A second source of power for one train can be supplied from the adjacent unit's start-up transformer, by appropriate manual action, in sufficient time following a loss of all on-site power supplies and other offsite power supplies to assure specified design limits are not exceeded.