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SUBJECT: Application for amend to license NPF-16, revising TS Tables 3.3-3 & 3.3-4 to accommodate improved coincidence logic & relay replacement for 4.16 kV loss of voltage relay.

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February 27, 1995

L-95-054
10 CFR 50.90

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

Re: St. Lucie Unit, 2
Docket No. 50-389
Proposed License Amendment
Emergency Bus Undervoltage Relays

Pursuant to 10 CFR 50.90, Florida Power & Light Company (FPL) requests to amend Facility Operating License NPF-16 for St. Lucie Unit 2 by incorporating the attached Technical Specifications revisions. The amendment will change Table 3.3-3 and 3.3-4 to accommodate an improved coincidence logic and relay replacement for the 4.16 kV Loss of Voltage Relays. Actions required for certain trip units with the number of operable channels one less than the total number of channels will also be changed. In addition, the format used to state the time delay for the 4.16 kV Degraded Voltage trip unit will be revised.


It is requested that the proposed amendment, if approved, be issued by September 1, 1995, prior to the scheduled refueling outage. It is also requested that upon issuance, a 60 day implementation period be granted.

Attachment 1 is an evaluation of the proposed TS changes. Attachment 2 is the "Determination of No Significant Hazards Consideration." Attachment 3 contains a copy of the appropriate TS pages marked-up to show the proposed changes.

The proposed amendment has been reviewed by the St. Lucie Facility Review Group and the Florida Power & Light Company Nuclear Review Board. In accordance with 10 CFR 50.91 (b)(1), a copy of the proposed amendment is being forwarded to the State Designee for the State of Florida.

Please contact us if there are any questions about this submittal.

Very truly yours,


D. A. Sager
Vice President
St. Lucie Plant

DAS/RLD

Attachments
cc: See next page

an FPL Group company

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cc: Stewart D. Ebnetter, Regional Administrator, Region II, USNRC.

Senior Resident Inspector, USNRC, St. Lucie Plant.

Mr. W.A. Passetti, Florida Department of Health and
Rehabilitative Services.

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ATTACHMENT 1

EVALUATION OF PROPOSED TS CHANGES

EVALUATION OF PROPOSED TS CHANGES.

Introduction

Florida Power and Light Company (FPL) proposes to change the St. Lucie Unit 2 Technical Specifications (TS) by revising Tables 3.3-3 and 3.3-4, "ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION," as they apply to the Loss of Power functional units. For the 4.16 kV Emergency Bus Undervoltage (Loss of Voltage) units, the total number of channels and the action for one inoperable channel will be changed to accommodate improvements in the trip design. The improvements planned for this function will eliminate the present vulnerability to a Loss of Voltage trip from a single relay failure or random voltage transient.

A change to the manner in which the time delay is specified for the 4.16 kV Emergency Bus Undervoltage (Degraded Voltage) function will be made to afford optimizing the field setpoint with relay and test equipment measurement tolerances. In addition, the action required for one inoperable channel of the 4.16 kV Loss of Voltage unit, and the 480 Volt Loss of Voltage unit, will be made consistent with the other Loss of Power functions.

Description of Changes

A. TABLE 3.3-3, for LOSS OF POWER FUNCTIONAL UNIT 6.a.(1), 4.16 kV Emergency Bus Undervoltage (Loss of Voltage):

1. Change the TOTAL NUMBER OF CHANNELS and CHANNELS TO TRIP from "1/Bus" to "2/Bus"
2. Change the required ACTION from "12" to "17"

B. TABLE 3.3-3, for LOSS OF POWER FUNCTIONAL UNIT 6.a.(2), 480 V Emergency Bus Undervoltage (Loss of Voltage):

1. Change the TOTAL NUMBER OF CHANNELS from "2/Bus" to "3/Bus"
2. Change the required ACTION from "12" to "17"

C. TABLE 3.3-4: For the LOSS OF POWER FUNCTIONAL UNIT 6.b.(1), 4.16 kV Emergency Bus Undervoltage (Degraded Voltage); change the TRIP VALUE and the ALLOWABLE VALUE specified for the time delay from "a 10-second time delay" to read, "< 10-second time delay"

Marked-up TS pages for the proposed changes are contained in Attachment 3.



Background

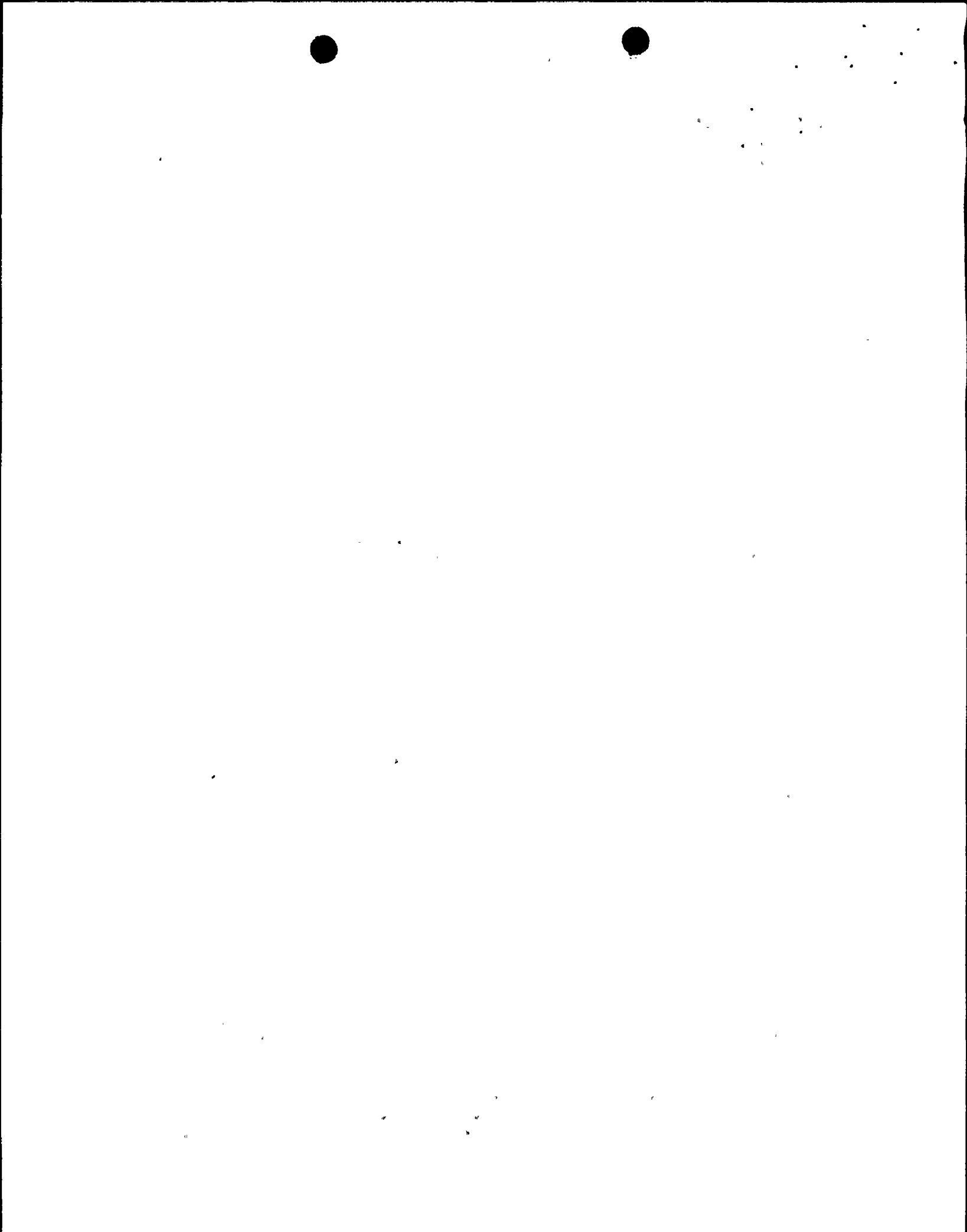
The protection scheme for the St. Lucie Unit 2 (PSL2) emergency electrical busses provides two levels of undervoltage protection, (1) loss of power and (2) degraded grid voltage, and conforms to NRC Power Systems Branch, Branch Technical Position PSB-1 (BTP PSB-1). The total number of channels, required number of channels to trip, minimum required channels operable, applicable plant operational modes, and action requirements for each trip unit are specified in Table 3.3-3. Minimum acceptable trip values and maximum acceptable time delays are specified in TS Table 3.3-4. To ensure compliance with the specified values, conservative setpoints and allowed tolerances for the associated relay settings are calculated, and employed in the field using controlled engineering drawings.

Emergency bus undervoltage protection for each of the two independent distribution trains includes functional units for:

- (a) 4.16 kV AC Loss of Voltage (CV-2 inverse time voltage relay).
- (b) 4.16 kV AC Degraded Voltage (solid state, time delay undervoltage relays). After the time delay expires, separation from the off-site power source will be initiated if a safety injection actuation signal (SIAS) is present. This unit also provides a degraded voltage alarm to the control room.
- (c) 480 Volt AC Loss of Voltage (solid state, definite time undervoltage relays) in conjunction with a time delay relay.
- (d) 480 Volt AC Degraded Voltage (solid state, definite time undervoltage relays) in conjunction with a time delay relay.

Any one of these functional units can initiate a transfer from the off-site power source to the on-site power source. The on-site AC power source consists of a dedicated Emergency Diesel Generator (EDG) for each distribution train.

With the exception of the 4.16 kV Loss of Voltage trip units, the relay "channels" associated with each trip function monitor the three line-to-line voltages, and the channel output contacts are connected in a two-out-of-three (2/3) tripping logic. The 4.16 kV Loss of Voltage function, on the other hand, is provided by a single inverse time voltage relay on each emergency bus, and a transfer to the on-site power source is initiated when bus voltage falls below its characteristic curve setpoint. Timing of the trip is inversely proportional to the voltage level.



To eliminate the present vulnerability to a Loss of Voltage trip from a single relay failure or random voltage transient on either emergency bus, FPL plans to replace the single 4.16 kV Loss of Voltage relay on each bus with two solid state, definite time relays. The output contacts for these relays will be connected for a 2/2 coincidence trip function.

Bases for TS Change

FPL used Ebasco Services Incorporated computer program AUXSYS4078 "Electrical Auxiliary System Design" to analyze the station auxiliary system and equipment voltages for both steady-state and transient conditions. The analysis and accompanying calculations established the minimum voltage levels at which prolonged operation of the equipment could lead to possible damage. The review of these voltage levels considered steady-state operation, transients (starting and run-through), and operability of non-motor loads and controls. The resultant relay setpoints for minimum voltage and maximum time delays assure that the Class 1E equipment will not be subjected to sustained degraded voltages under accident and non-accident conditions.

1) 4.16 kV AC Loss of Voltage: The loss of voltage protective function at the 4.16 kV level is currently provided by a single electro-mechanical relay on each of the 2A3 and 2B3 Emergency Busses. The minimum allowed voltage setting of ≥ 3120 Volts is specified in Table 3.3-4. The actual trip point is a function of the relay's inverse time voltage characteristic.

The proposed trip logic is the same as approved for St. Lucie Unit 1 and will eliminate the existing vulnerability to an unwarranted trip actuation caused by a single relay failure or spurious voltage transient. The minimum allowed voltage setpoint is not being changed. A maximum voltage setting, considering voltage drops that occur from the worst-case starting transient, is also determined from the analysis of steady-state and transient conditions and ensures that spurious actuation of the relays will not occur.

The solid state relays are definite time (0.1 - 1.0 sec), are easier to accurately calibrate and maintain in the field, and are considered to be more reliable than the electro-mechanical relays. The field settings for the relays are optimized considering test instrument, relay, and potential transformer errors, and are specified in controlled engineering (setpoint) drawings. Therefore, assurance is provided that the 4.16 kV AC Loss of Voltage protection feature will continue to perform within the limits required by the Limiting Conditions for Operation.

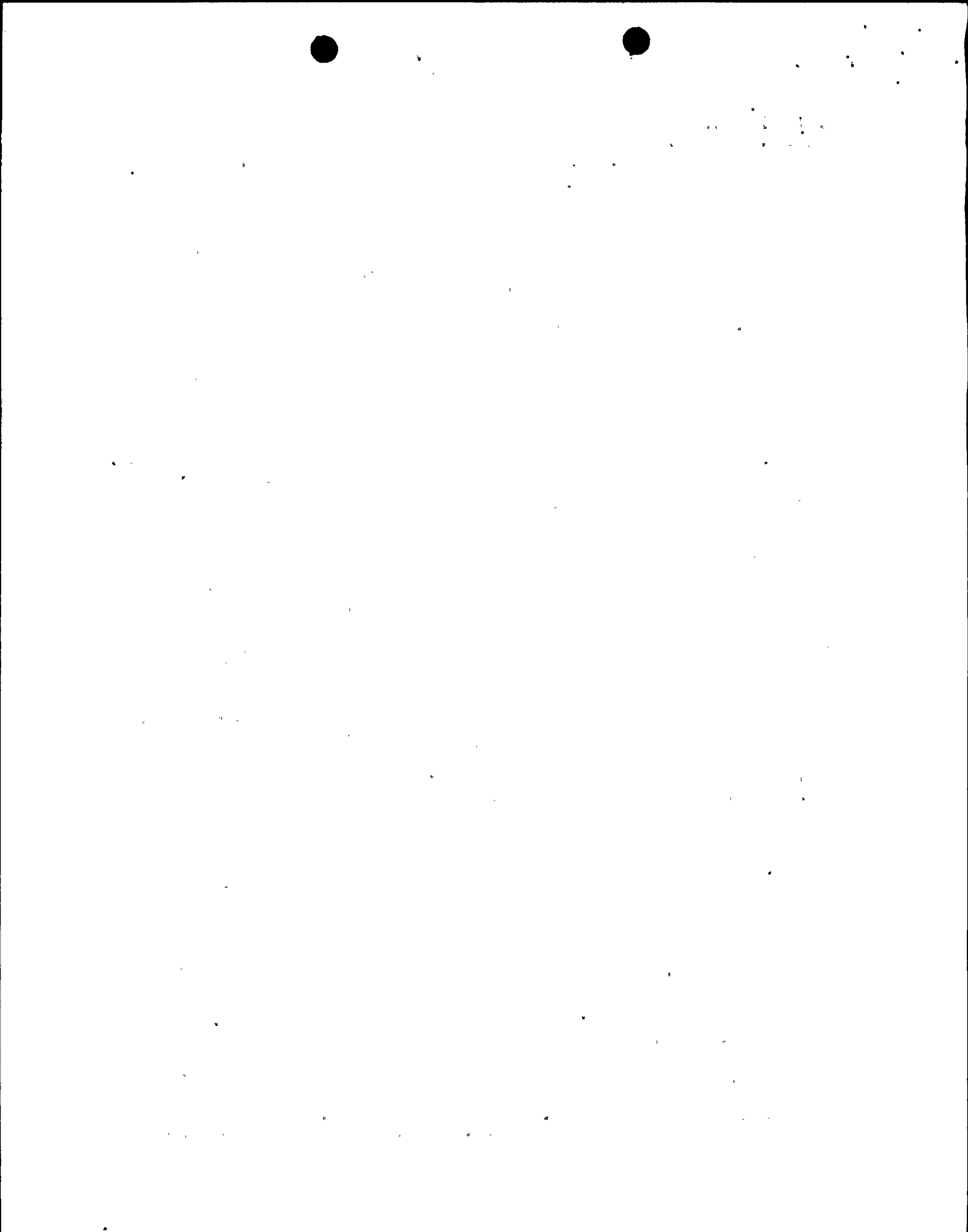


Table 3.3-3 requires ACTION 12 be implemented for a case where the number of OPERABLE channels is one less than the Total Number of Channels, and this action requires a plant shutdown if the inoperable channel is not restored to OPERABLE status within 48 hours. FPL considers this action appropriate for the existing, single relay/Bus design. However, for the revised configuration, ACTION 17 is proposed. The proposed action does not change the 48 hour interval for restoring an inoperable channel to OPERABLE status, but allows continued plant operation if the inoperable channel is placed in the tripped condition. The design upgrade of two channels/Bus will preserve the 4.16 kV AC Loss of Voltage protective function if one channel/Bus is in trip. Therefore, FPL considers the additional flexibility afforded by ACTION 17 to be acceptable for the proposed design.

2) 480 Volt AC Loss of Voltage: Table 3.3-3 erroneously lists the "TOTAL NO. OF CHANNELS" for the 480 Volt Loss of Voltage function as 2/Bus. The proposed change to 3/Bus will rectify this error and make the table consistent with the plant configuration.

Similar to the previous discussion involving a change of the specified action from ACTION 12 to ACTION 17, the 480 Volt Loss of Voltage channels are connected for 2/3 coincidence logic, and will preserve the Loss of Voltage protective feature during plant operation with one channel/Bus in the tripped condition. Therefore, FPL considers the proposed ACTION 17 to be acceptable.

3) 4.16 kV AC Degraded Voltage (Coincident with SIAS): Table 3.3-4 states the trip value for this function as ≥ 3848 Volts with " a 10 second time delay." The settings assure adequate starting voltage and continued safe operation of equipment during accident conditions, and the time delay allows bus voltage recovery following simultaneous start of all SIAS loads. The minimum allowed voltage setting is not being changed. However, restating the time delay as " < 10 seconds " will allow optimizing the field setting to account for component and calibration equipment tolerances based on the transient analysis of system and component voltages.

The original design criteria considers steady-state running, run-through and starting motor voltages, adequate control power to operate all 480 Volt system loads, 90% of rated voltage at the Class 1E 120/208 volt power panels, simultaneous start of all SIAS initiated loads, and assurance that spurious tripping due to short term system disturbances or large motor starting transients will not occur. This design criteria will continue to be satisfied.



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The proposed maximum time delay is less than that required for EDG start and loading. Therefore, the proposed time specification will continue to provide assurance that proper load shedding and EDG loading will occur, and that the time delay assumed in the accident analyses for connecting the emergency bus to the diesel generator will not be exceeded.

Conclusions

Application of the design change will result in a 4.16 kV AC Loss of Voltage protection scheme that is inherently more responsive to the electrical auxiliary system conditions, is easier to maintain and calibrate, and is consistent with the corresponding protection feature approved for St. Lucie Unit 1.

The proposed method of stating the maximum time delay allowed for the 4.16 kV Degraded Voltage (coincident with SIAS) is consistent with the original design criteria, Branch Technical Position PSB-1, and with the format of other limiting settings stated in the same table.

The ACTION proposed for the Loss of Voltage functions, in the event that the number of OPERABLE channels is one less than the Total Number of Channels, is consistent with the action required for the Degraded Voltage trip functions.

Changing the Total Number of Channels for the 480 Volt Loss of Voltage function from 2/Bus to 3/Bus simply corrects an error in Table 3.3-3 and, therefore, is only an administrative change.

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Emergency Bus Undervoltage Relays

ATTACHMENT 2

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATION

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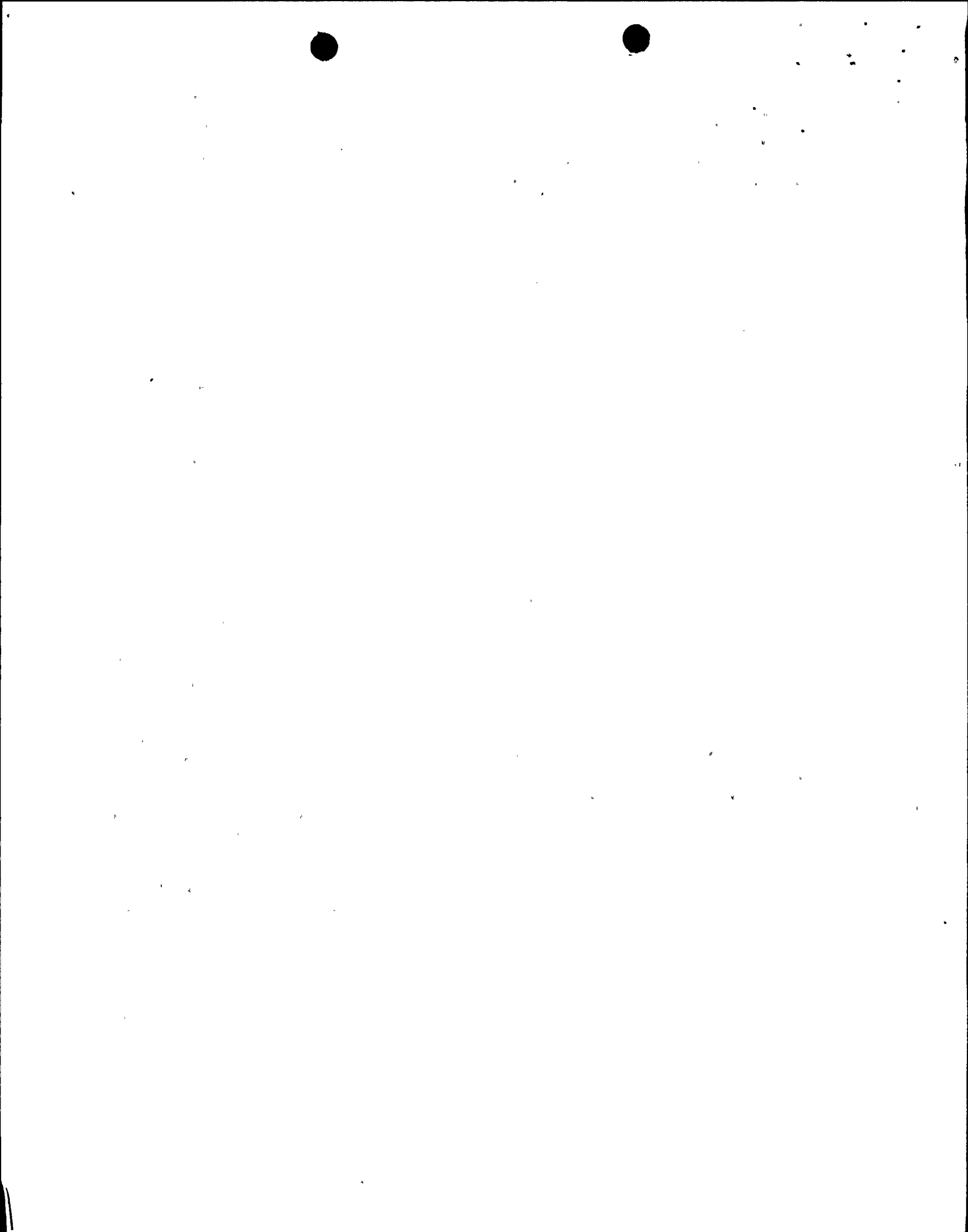
Pursuant to 10CFR50.92, a determination may be made that a proposed license amendment involves no significant hazards consideration if operation of the facility in accordance with the proposed amendment would not: (1) involve a significant increase in the probability or consequences of an accident previously evaluated; or (2) create the possibility of a new or different kind of accident from any accident previously evaluated; or (3) involve a significant reduction in a margin of safety. Each standard is discussed as follows:

(1) Operation of the facility in accordance with the proposed amendment would not involve a significant increase in the probability or consequences of an accident previously evaluated.

The proposed change will result in a better overall posture of the plant under degraded/loss of voltage conditions. The design upgrade for the 4.16 kV Loss of Voltage system is more reliable, has inherently higher accuracy, and is easier to maintain and calibrate in the field. The coincidence logic will eliminate the spurious plant trip potential from the existing design. Restating the maximum time delay for the 4.16 kV Degraded Voltage (coincident with SIAS) protective relays in a "less than" format will assure that the transfer of power to the on-site sources occurs before the level of voltage becomes injurious to the equipment under accident conditions, and will ensure that stripping of the emergency power busses and loading of the EDG(s) will occur within the time allowed by original design criteria. The maximum allowed time delay for this function is not being increased, and the time delay assumed in the accident analyses for connecting the emergency bus to the diesel generator will not be exceeded. Therefore, operation of the facility in accordance with the proposed amendment will not involve a significant increase in the probability or consequences of an accident previously evaluated.

(2) Operation of the facility in accordance with the proposed amendment would not create the possibility of a new or different kind of accident from any accident previously evaluated.

The proposed amendment does not change the operation, function or modes of plant operation. The ability of the loss of power and degraded grid voltage protection scheme to properly transfer from



the off-site to the on-site power sources is being maintained. The relays in the improved design of the 4.16 kV Loss of Voltage function are of the type presently being used in identical applications at both St. Lucie plant units. No new hazards are created or postulated which may cause an accident different from any accident previously analyzed. The modifications will result in a more sensitive protection scheme allowing continuous operation without unnecessary challenges to the safety systems, and will continue to provide adequate protection to all the safety equipment. Therefore, operation of the facility in accordance with the proposed amendment would not create the possibility of a new or different kind of accident from any accident previously evaluated.

(3) Operation of the facility in accordance with the proposed amendment would not involve a significant reduction in a margin of safety.

The capability of the loss of power and degraded grid voltage protection scheme is enhanced by the changes being proposed and is confirmed by the existing surveillance requirements. The planned modifications to the 4.16 kV Loss of Voltage function will result in a more sensitive undervoltage detection system and reduce the possibility of spurious actuation. The maximum time assumed in the safety analyses for connecting each Emergency Bus to its dedicated Emergency Diesel Generator is not being changed, and assurance that separation from a degraded off-site power source will occur before this time interval is exceeded during accident conditions will be maintained by the proposed amendment. Accordingly, the margin of safety is not affected. Therefore, operation of the facility in accordance with the proposed amendment would not involve a significant reduction in a margin of safety.

Based on the discussion presented above and on the supporting Evaluation of Proposed TS Changes, FPL has concluded that this proposed license amendment involves no significant hazards consideration.

