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U. S. Nuclear Regulatory Commission
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Joseph M. Farley Nuclear Plant, Units 1 and 2
Technical Specification 3.3.5
Loss of Power Diesel Generator Start Instrumentation
License Amendment Request

Ladies and Gentlemen:

In accordance with the requirements of 10 CFR 50.90, Southern Nuclear Operating Company (SNC) hereby requests an amendment to the Joseph M. Farley Nuclear Plant (FNP) Units 1 and 2 Technical Specifications (TS). This amendment request proposes to revise TS 3.3.5, "Loss of Power Diesel Generator Start Instrumentation," as described in the Enclosures to this letter.

Revision of the TS 3.3.5 degraded grid voltage relay actuation requirements is needed to enable compliance with the license condition stated in Appendix C of FNP Unit 1 Renewed Operating License NPF-2, and in Appendix C of FNP Unit 2 Renewed Operating License NPF-8. This license condition requires SNC to implement modifications that will eliminate use of manual actions as part of the FNP degraded voltage protection scheme, and is to be complete before restart from the Fall 2017 refueling outage for Unit 2 (2R25) and before restart from the Spring 2018 refueling outage for Unit 1 (1R28).

Enclosure 1 provides the basis for the proposed changes, Enclosure 2 provides the marked-up TS 3.3.5 pages (along with unaffected pages included for context) and Enclosure 3 provides the clean-typed TS 3.3.5 pages. Also provided for information in Enclosure 4 are marked-up pages (along with unaffected pages included for context) showing associated changes planned for the TS 3.3.5 Bases.

SNC requests approval of the proposed license amendment by November 30, 2016, with implementation within 90 days.

In accordance with the requirements of § 50.91, a copy of this request is provided to the designated Alabama official.

This letter contains no NRC commitments. If you have any questions, please contact Ken McElroy at (205) 992-7369.

Mr. Pierce states he is Regulatory Affairs Director of Southern Nuclear Operating Company, is authorized to execute this oath on behalf of Southern Nuclear Operating Company and to the best of his knowledge and belief, the facts set forth in this letter are true.

Respectfully submitted,

C. R. Pierce

C. R. Pierce
Regulatory Affairs Director

Sworn to and subscribed before me this 20th day of November, 2015.

Laura L. Cright
Notary Public

My commission expires: 10-8-2017

CRP/DWD/<>

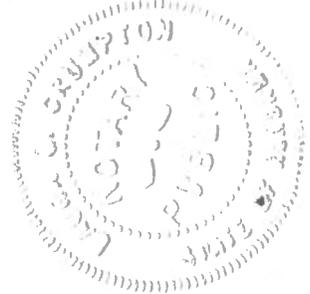
Enclosures:

1. Basis for Proposed Changes
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3. FNP Units 1 and 2 Technical Specification 3.3.5 Clean Typed Pages
4. FNP Units 1 and 2 Technical Specification 3.3.5 Bases Marked-Up Pages

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**Joseph M. Farley Nuclear Plant, Units 1 and 2
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Enclosure 1

Basis for Proposed Changes

Enclosure 1
Basis for Proposed Changes

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Enclosure 1

Basis for Proposed Changes

1.0 Summary Description

This proposed license amendment request (LAR) by Southern Nuclear Operating Company (SNC) is made, pursuant to the requirements of 10 CFR 50.90, for a change to the Joseph M. Farley Nuclear Plant (FNP), Units 1 and 2, Technical Specifications (TS). This amendment request proposes to revise the setpoint requirements in TS 3.3.5, "Loss of Power Diesel Generator Start Instrumentation," for the 4.16 kV Emergency Bus Degraded Grid Voltage Actuation and Alarm functions as follows (and as shown in the marked-up and clean typed pages of Enclosures 2 & 3):

- A) In the LCO 3.3.5 and APPLICABILITY sections of TS 3.3.5, add "and Table 3.3.5-2" after each reference to Table 3.3.5-1.
- B) Under APPLICABILITY, add the following NOTES:
 - 1. "For Unit 1, use Table 3.3.5-1 until Mode 4 entry following the spring 2018 outage (1R28); thereafter use Table 3.3.5-2."
 - 2. "For Unit 2, use Table 3.3.5-1 until Mode 4 entry following the fall 2017 outage (2R25); thereafter use Table 3.3.5-2."
- C) Following Table 3.3.5-1, "Loss of Power Diesel Generator Start Instrumentation," add a new page with Table 3.3.5-2. Table 3.3.5-2 differs from Table 3.3.5-1 as follows:
 - 1. Function 1, "4.16 kV Emergency Bus Loss of Voltage DG Start" and Function 2, "4.16 kV Emergency Bus Degraded Grid Voltage Actuation," has the Trip Setpoint column replaced by a new Delay Time column,
 - 2. Function 2 has the singular Allowable Value (AV) voltage range specified for all buses replaced with new AV lower limits specified for each 4.16 kV bus (1F, 1G, 2F & 2G), and
 - 3. Function 3, "4.16 kV Emergency Bus Degraded Grid Voltage Alarm," is deleted.

2.0 Detailed Description

Revision of the TS Table 3.3.5-1 setpoint requirements is needed to fulfill a license condition contained in FNP Unit 1 Renewed Operating License NPF-2 and in FNP Unit 2 Renewed Operating License NPF-8, which was added to Appendix C of each license by Amendments No. 194 and No. 190, respectively. These amendments were requested by SNC by letter dated December 21, 2012 (Ref. 5), as supplemented by letter dated May 21, 2013 (Ref. 6).

The pertinent license condition states that "SNC shall implement the Degraded Voltage modifications to eliminate the manual actions in lieu of automatic degraded voltage protection to assure adequate voltage to safety-related equipment during design basis events." Completion of this license condition is required before restart from the spring 2018 outage for Unit 1 (U1R28) and before restart from the fall 2017 outage for Unit 2 (U2R25). The changes proposed by this LAR are to enable compliance with these License Conditions.

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It is proposed that a new Table 3.3.5-2 be added to TS which will contain the revised loss of power diesel generator start instrumentation specifications which are entailed in eliminating manual actions from the FNP degraded voltage protection scheme. Reference to Table 3.3.5-2 will be added to LCO 3.3.5 and the APPLICABILITY statement, followed by NOTES to accommodate the differing implementation dates for Unit 1 and Unit 2, as follows:

1. For Unit 1, use Table 3.3.5-1 until Mode 4 entry following the spring 2018 outage (1R28); thereafter use Table 3.3.5-2.
2. For Unit 2, use Table 3.3.5-1 until Mode 4 entry following the fall 2017 outage (2R25); thereafter use Table 3.3.5-2.

The proposed Table 3.3.5-2 differs from Table 3.3.5-1 as follows:

- a) Function 1, "4.16 kV Emergency Bus Loss of Voltage DG Start" and Function 2, "4.16 kV Emergency Bus Degraded Grid Voltage Actuation," has the Trip Setpoint column replaced by a new Delay Time column,
- b) Function 2 has the singular Allowable Value (AV) voltage range specified for all buses replaced with new AV lower limits specified for each 4.16 kV bus (1F, 1G, 2F & 2G), and
- c) Function 3, "4.16 kV Emergency Bus Degraded Grid Voltage Alarm," is deleted.

These changes are shown in the marked-up and clean typed TS 3.3.5 pages provided in Enclosures 2 & 3. In addition, Enclosure 4 provides, for information only, mark-ups of anticipated corresponding changes to the TS 3.3.5 Bases to accommodate the overlapping period of applicability of Tables 3.3.5-1 and 3.3.5-2, and of the overlapping period of service of the existing type of DVRs and of the new type DVRs which will replace them on a bus-by-bus basis.

The new degraded voltage relay (DVR) actuation voltage AV limits listed individually in Table 3.3.5-2 Function 2 for the four 4.16 kV emergency buses (Buses 1F, 1G, 2F & 2G) are increased from the existing AV range specified in Table 3.3.5-1 so as to provide for fully automatic degraded voltage protection on each bus, eliminating the need for administrative controls (i.e. manual actions), as are used in the existing FNP degraded voltage protection scheme.

To enable implementation of the higher AV limits in Table 3.3.5-2, the induction disc type relays currently used for the DVR function will be replaced with new solid-state relays. Replacement of the induction disc relays with solid-state relays was evaluated and determined not to constitute a digital upgrade per procedurally established criteria. Because the new solid-state relays provide for discrete setting of actuation delay time rather than actuating according to an inverse-time characteristic curve like the existing induction disc relays, a Delay Time column is added to Table 3.3.5-2.

Installation of the new DVRs is planned to be performed one bus at a time over two successive refueling outages for each unit, beginning with Bus 2G in spring 2016 (2R24) and Bus 1G in fall 2016 (1R27). The new DVRs will initially be set to actuate per the existing TS Table 3.3.5-1 Function 2 requirements. Approval of

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this LAR adding Table 3.3.5-2 is expected to occur prior to the second round of DVR replacement, which is to be performed on Bus 2F in fall 2017 (2R25) and on Bus 1F in spring 2018 (1R28). During the outages when the new DVRs are installed on each "F" bus, the "G" bus DVRs will be re-set per Table 3.3.5-2.

Thus, for the operating cycles beginning with 2R24 and 1R27, each unit will operate with both induction disc and solid-state type relays in service, with both relay types set to actuate per the existing TS Table 3.3.5-1 requirements. For the period between 2R25 and 1R28, the new Table 3.3.5-2 requirements will be in effect for Unit 2 while Table 3.3.5-1 will still apply for Unit 1. From spring 2018 (1R28) onward, Table 3.3.5-1 will no longer have any applicability. At a convenient subsequent opportunity an administrative LAR will be made to delete Table 3.3.5-1, at which time Table 3.3.5-2 will be re-numbered as a new Table 3.3.5-1 and the references to Table 3.3.5-2 in TS 3.3.5 will be deleted, along with the NOTES under the APPLICABILITY statement. Appropriate changes to amend discussion of Table 3.3.5-1 and delete discussion of Table 3.3.5-2 will then be made to the TS 3.3.5 Bases as well.

Background:

The existing FNP degraded voltage protection scheme, which relies on administrative controls (i.e. manual actions) to assure adequate voltage to safety-related equipment during design basis events by avoiding or minimizing the occurrence of degraded voltage conditions, was accepted by the Nuclear Regulatory Commission (NRC) in a November 21, 1995 Safety Evaluation Report (SER) (Ref. 1). This SER relied in part on a commitment by SNC to include limiting conditions for operations and surveillance requirements for the degraded grid voltage alarm relays in the planned conversion to Improved Technical Specifications (ITS). In fulfillment of this commitment, Function 3, "4.16 kV Emergency Bus Degraded Grid Voltage Alarm" was added to Table 3.3.5-1 when the ITS was issued on November 30, 1999 (Ref. 2).

During the Component Design Basis Inspection (CDBI) performed at FNP in 2011, the NRC inspection team identified an Unresolved Item (URI) regarding the use of administrative controls at FNP in lieu of automatic degraded voltage protection to assure adequate voltage to safety-related equipment during design basis events. The December 19, 2011 CDBI report (Ref. 3) designated this issue as URI 050000348, 364/2011010-10, "Administrative Controls in lieu of Automatic Actions for Degraded Voltage Protection," and noted the similarity of this issue to the degraded voltage protection issue then under appeal for Hatch Nuclear Plant (HNP). In addition, on December 29, 2011, the NRC distributed Regulatory Issue Summary (RIS) 2011-12 (Ref. 4) to clarify the staff's technical position on existing regulatory requirements and the voltage studies necessary to properly determine DVR settings.

Consistent with the position expressed by the NRC staff in the CDBI report and in RIS 2011-12, the appeal process in the HNP degraded voltage case was resolved with a definitive determination that reliance on manual actions as part of

Enclosure 1 Basis for Proposed Changes

the degraded voltage protection scheme did not meet regulatory requirements, and that previous acceptance of this protection scheme by the NRC staff did not constitute an exemption from the regulations. In consequence, SNC elected to resolve the 2011 CDBI degraded voltage URI at FNP by submitting a LAR on December 21, 2012 (Ref. 5) which provided a schedule for implementing plant modifications to eliminate manual actions for degraded voltage protection at FNP; this LAR, supplemented by additional information in a letter dated May 21, 2013 (Ref. 6), resulted in the License Amendments cited above, which were issued May 13, 2014 (Ref. 7).

3.0 Technical Evaluation

Successful operation of the required functions of the Engineered Safety Features (ESF) systems is dependent upon the availability of adequate power sources for energizing the various components such as pump motors, motor operated valves, and associated control components. Offsite power is the preferred source of power for the 4160V emergency buses which power the required components. The Loss of Power (LOP) protection instrumentation monitors voltage on the F and G 4160V buses of each FNP unit. Each electrical train has independent LOP instrumentation and relay actuation logic for detecting degraded grid or loss of voltage conditions, and initiating an LOP emergency diesel generator (EDG) start signal.

There are currently three LOP protection instrumentation actuation levels. An alarm sounds at a set point of not less than 3850V on detection of degraded grid voltage. At not less than 3675V a LOP signal is generated for sustained degraded grid voltage. At not less than 3255V a LOP signal is generated for near instantaneous loss of voltage conditions. Actuation of the degraded grid or loss of voltage relays will automatically disconnect the 4160V emergency buses from the offsite power source.

An administrative limit is established at a voltage level between the degraded grid voltage alarm allowable value and the automatic degraded grid voltage actuation upper allowable value. In the voltage range between the administrative limit and the degraded grid voltage actuation trip setpoint, a few ESF components may not have automatic protection from inadequate voltage. The manual actions provide the primary means of protecting these few ESF components from a sustained, slightly low voltage condition and all components from unnecessary automatic disconnection from the preferred offsite power source.

FNP's current degraded voltage protection scheme requires upgrades because it currently relies upon administrative controls to assure adequate voltage is supplied to safety-related equipment during design basis events. The automatic portion of the degraded voltage protection scheme employs setpoints which are too low to assure operability of all safety-related electrical equipment in case of a sustained degraded grid voltage condition, instead relying on administrative controls (i.e. manual actions) to assure adequate voltage is supplied to safety-related equipment during accident conditions.

While the FNP electrical distribution system is capable of providing sufficient

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margin between the minimum expected bus voltage and the voltage level required by the safety-related equipment, achieving fully automatic degraded voltage protection will require installation of new type DVRs as well as higher actuation setpoints. The design of the existing DVRs does not allow resolution of this issue through set point adjustment alone.

The DVRs are intended to protect plant equipment from an undervoltage condition when the 4.16 kV emergency buses are powered from the off-site grid. The DVRs monitor voltage on Buses 1F, 1G, 2F & 2G (three relays per bus) and actuate when the voltage falls below a pre-determined value and remains below this value for a specified amount of time. Actuation of any two out of three relays on the same bus results in an automatic trip of the applicable 4.16 kV preferred power supply breakers, disconnecting the undervoltage (degraded) bus from its offsite preferred power source; that bus is then transferred to receive power from its alternate power supply, an EDG.

The DVR actuation voltage and delay time settings should minimize nuisance tripping during normal operating conditions but still ensure that the voltage requirements of the safety-related loads are met without exceeding the maximum time delay assumed in the safety analyses. As the 1995 SER acknowledged, however, the existing actuation voltage range AV and setpoint specified for the FNP DVRs (Function 2 in TS Table 3.3.5-1) is such that a sustained degraded voltage condition could occur in which grid voltage is too low to assure proper operation of safety-related equipment, yet not low enough to cause the DVRs to automatically separate the emergency buses from grid power and transfer to the EDGs.

This gap is addressed in the existing protection scheme by means of the Degraded Grid Voltage Alarm (Table 3.3.5-1, Function 3), which is intended to alert plant operators to degraded grid voltage conditions and prompt their coordination with the offsite power system operators on actions to restore grid voltage. At present, these manual actions are the means relied on to protect safety-related equipment from inadequate voltages in the range where automatic protection is not provided by the DVRs. With implementation of plant modifications (including installation of the new type 27N DVRs) which enable use of higher DVR actuation voltage setpoints in accordance with the new TS Table 3.3.5-2 Function 2 AVs, reliance on manual actions for degraded voltage protection will be eliminated. The Degraded Grid Voltage Alarm function, though it will remain in service, will in consequence be returned to its previous role as a non-TS alarm, with Function 3 deleted from TS 3.3.5, restoring consistency with the standard TS.

Calculations were performed to determine the acceptable voltage operating range at the 4.16 kV emergency buses. Offsite power system voltage at FNP is not intentionally lowered below 101.6% of 230 kV, and system voltages for worst-case single contingencies are expected to remain at or above 101.0%. Therefore, the minimum expected voltage (MEV) was calculated as the 4.16 kV bus voltage which would occur during a loss of coolant accident (LOCA) steady-state loading condition concurrent with a 230kV switchyard voltage of 101.0%.

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Based on this MEV, the minimum required voltage (MRV) was determined as the greater of: a) the minimum acceptable steady-state voltage for normal operation of Class 1E loads, using maximum expected non-accident bus loading, b) the minimum pre-start voltage providing acceptable Class 1E motor starting (e.g. during LOCA group motor starting, using maximum expected accident loading, or c) the minimum steady-state voltage providing acceptable Class 1E motor starting and operation for individual motors, using maximum expected accident loading.

The MRV value for each emergency bus was used in calculating the DVR actuation voltage AVs specified in TS Table 3.3.5-2. Since the safety-related function of the DVRs is to actuate when the voltage falls below a pre-determined value and remains below this value for a specified amount of time, the voltage AVs are given in Table 3.3.5-2 as one-sided limits in "≥" (greater-than-or-equal-to) form while the Delay Times are given as one-sided limits in "≤" (less-than-or-equal-to) form.

4.0 Regulatory Evaluation

4.1 Significant Hazards Consideration

The proposed Amendment would revise the relay setpoint requirements for the 4.16 kV Emergency Bus Degraded Grid Voltage Actuation function in the Farley Nuclear Plant (FNP) Units 1 and 2 Technical Specifications (TS). TS 3.3.5, "Loss of Power Diesel Generator Start Instrumentation" would be revised so as to fulfill a License Condition requirement to eliminate use of manual actions from the degraded voltage protection scheme. Also, with the 4.16 kV Emergency Bus Degraded Grid Voltage Alarm function thereby being made unnecessary as part of the protection scheme, the Alarm function would be deleted from TS 3.3.5 by the proposed Amendment as well.

Southern Nuclear Operating Company (SNC) has evaluated the proposed changes to TS 3.3.5 using the criteria in 10 CFR 50.92 and has determined that the proposed changes do not involve a significant hazards consideration.

As required by 10 CFR 50.91(a), the SNC analysis supporting a determination of no significant hazards consideration using the standards in 10 CFR 50.92 is presented below:

1. Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?
Response: No

The proposed license amendment request changes the TS 3.3.5 requirements for loss of power diesel generator start instrumentation to enable elimination of manual actions for protection of safety-related equipment from degraded voltage conditions during design basis events. Elimination of these manual actions is required to fulfill an existing License Condition on each unit.

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The proposed change increases the Allowable Value (AV) for the 4.16 kV Emergency Bus Degraded Grid Voltage Actuation function. Installation of new, higher precision Degraded Voltage Relays (DVRs) makes possible an increase in the DVR actuation setpoint (encompassed by the AV) to a level which provides fully automatic protection of safety-related equipment while minimizing the chance of unwanted disconnection from the preferred offsite power source, which is itself an analyzed condition.

Based on the above, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No

The proposed license amendment request changes the TS 3.3.5 requirements for loss of power diesel generator start instrumentation to enable elimination of manual actions for protection of safety-related equipment from degraded voltage conditions during design basis events. Elimination of these manual actions is required to fulfill an existing License Condition on each unit.

The proposed changes to TS 3.3.5 do not change the methods of normal plant operation nor the methods of response to transient conditions, save that the range of automatic action provided by the DVRs is expanded. This change will eliminate the need for manual action from the degraded voltage protection scheme, as required by a License Condition for each unit, to achieve compliance with 10 CFR 50.55a(h)(2) and 10 CFR Part 50, Appendix A, General Design Criterion 17 - Electric Power Systems.

Accordingly, the proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

3. Does the proposed amendment involve a significant reduction in a margin of safety?

Response: No

Margin of safety is provided by the performance capability of plant equipment in preventing or mitigating challenges to fission product barriers under postulated operational transient and accident conditions. Since the proposed license amendment request changes the TS 3.3.5 requirements for loss of power diesel generator start instrumentation to enable elimination of manual actions for protection of safety-related equipment from degraded voltage conditions during design basis events, it will tend to increase the margin of safety by better protecting the safety-

Enclosure 1 Basis for Proposed Changes

related plant equipment.

Based on the above, the proposed change does not involve a significant reduction in a margin of safety.

SNC concludes that the proposed change presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and accordingly, a finding of no significant hazards consideration is justified.

4.2 Applicable Regulatory Requirements/Criteria

This license amendment request is submitted to ensure compliance with applicable provisions of 10 CFR 50.55a(h)(2) and 10 CFR Part 50, Appendix A, General Design Criterion 17 - Electric Power Systems.

The existing degraded voltage protection scheme for FNP, which relied partially on manual action, was established in accordance with the NRC Safety Evaluation Report (SER) issued November 21, 1995 (Ref. 1). This SER allowed for a voltage "deadband" between the minimum required voltage at the 4160V buses (the calculated voltage value at which the required safety related loads have been evaluated to start and run in response to an automatic safety injection actuation) and the DVR setpoint.

In connection with the 1995 SER, limiting conditions for operation and surveillance requirements for the degraded grid voltage alarm relays were made part of the Technical Specifications (Function 3 in Table 3.3.5-1), along with the loss of voltage and degraded grid voltage relays (Functions 1 and 2, respectively, in Table 3.3.5-1). NRC subsequently concluded that reliance on manual actions as part of the degraded voltage protection scheme did not meet regulatory requirements, and that previous acceptance of this protection scheme by the NRC staff did not constitute exemption from the regulations.

By letter dated December 21, 2012, (Ref. 5) SNC proposed a schedule to implement degraded voltage modifications to address this issue, and by letter dated May 13, 2014 (Ref. 7), NRC accepted the proposed schedule. License Conditions were added to the FNP Unit 1 and Unit 2 Facility Operating Licenses requiring that "SNC shall implement the Degraded Voltage modifications to eliminate the manual actions in lieu of automatic degraded voltage protection to assure adequate voltage to safety-related equipment during design basis events."

Completion of the License Conditions is required by the Unit 1 2018 Spring Outage (1R28) and the Unit 2 2017 Fall Outage (2R25).

4.3 Precedent

This license amendment request is made pursuant to existing License Conditions applicable to FNP Units 1 and 2, which were issued May 13, 2014 (Ref. 7).

Enclosure 1

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Similar License Conditions, which will likewise require similar TS changes to expand the DVR action range, are in place for Edwin I. Hatch Nuclear Plant, Units 1 and 2 (the Hatch license amendment request has not yet been submitted).

4.4 Conclusion

In conclusion, based on the considerations discussed above: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner; (2) such activities will be conducted in compliance with the Commission's regulations; and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

5.0 Environmental Consideration

Southern Nuclear has evaluated the proposed amendment to change the FNP Technical Specifications and determined that the amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in the individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), an environmental assessment of the proposed amendment is not required.

6.0 References

1. November 21, 1995 – letter from Pierce H. Skinner, USNRC, to D.N. Morey, SNC, “NRC Inspection Report Nos. 50-348/95-18 and 50-364/95-18, Notice of Violation, and Safety Evaluation Report”
2. November 30, 1999 – letter from L. Mark Padovan, USNRC, to D.N. Morey, SNC, “Joseph M. Farley Nuclear Plant, Units 1 and 2 – Issuance of Amendments Re: Conversion to Improved Standard Technical Specifications (TAC Nos. MA1364 and MA 1365)”
3. December 19, 2011 – letter from Rebecca Nease, USNRC, to T.A. Lynch, SNC, “Joseph M. Farley Nuclear Plant – NRC Component Design Bases Inspection – Inspection Report 05000348/2011010 and 050003564/2011010”
4. December 29, 2011 – NRC Regulatory Issue Summary (RIS) 2011-12, Rev. 1, “Adequacy of Station Electric Distribution System Voltages”
5. December 21, 2012 – letter NL-12-2142, from M.J. Ajluni, SNC, to USNRC, “Joseph M. Farley Nuclear Plant - Units 1 and 2, Facility Operating License Amendment Request for Degraded Voltage Protection Modification Schedule”

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6. May 21, 2013 – letter NL-13-0933, from C.R. Pierce, SNC, to USNRC, “Joseph M. Farley Nuclear Plant Response to Request for Additional Information Concerning Degraded Voltage Compensatory Measures”

7. May 13, 2014 – letter from Shawn A. Williams, USNRC, to C.R. Pierce, SNC, “Joseph M. Farley Nuclear Plant, Units 1 and 2, Issuance of Amendments to Incorporate the Schedule for Degraded Grid Voltage Modification (TAC Nos. MF0468 and MF0469)”

**Joseph M. Farley Nuclear Plant, Units 1 and 2
Technical Specification 3.3.5
Loss of Power Diesel Generator Start Instrumentation
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Enclosure 2

FNP Units 1 and 2 Technical Specification 3.3.5

Marked-Up Pages

(unaffected pages are also provided for context)

3.3 INSTRUMENTATION

3.3.5 Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation

LCO 3.3.5 The LOP instrumentation for each Function in Table 3.3.5-1 shall be OPERABLE.

and Table 3.3.5-2.

APPLICABILITY: According to Table 3.3.5-1.

Insert A

ACTIONS

NOTE

Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. NOTE Only applicable to Functions 1 and 2.</p> <hr/> <p>One or more functions with one channel per train inoperable.</p>	<p>A.1 NOTE The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels.</p> <hr/> <p>Place channel in trip.</p>	6 hours
<p>B. NOTE Only applicable to Functions 1 and 2.</p> <hr/> <p>One or more Functions with two or more channels per train inoperable.</p>	<p>B.1 Restore all but one channel per train to OPERABLE status.</p>	1 hour
<p>C. Required Action and associated Completion Time of Condition A or B not met.</p>	<p>C.1 Enter applicable Condition(s) and Required Action(s) for the associated DG made inoperable by LOP DG start instrumentation.</p>	Immediately

No change on this page; provided for reference only.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>D. NOTE Only applicable to Function 3.</p> <hr/> <p>One Alarm Function channel inoperable on one or more trains.</p>	D.1 Verify voltage on associated bus is ≥ 3850 volts.	Once per 4 hours
E. Required Action and associated Completion Time of Condition D not met.	E.1 Restore bus voltage to ≥ 3850 volts.	1 hour
F. Required Action and associated Completion Time of Condition E not met.	<p>F.1 Be in MODE 3.</p> <p><u>AND</u></p> <p>F.2 Be in MODE 5.</p>	<p>6 hours</p> <p>36 hours</p>

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.3.5.1 NOTES</p> <ol style="list-style-type: none"> 1. TADOT shall exclude actuation of the final trip actuation relay for LOP Functions 1 and 2. 2. Setpoint verification not required. <hr/> <p>Perform TADOT.</p>	<p>In accordance with the Surveillance Frequency Control Program</p>

No change on this page; provided for reference only.

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.5.2	<p>-----NOTE----- CHANNEL CALIBRATION shall exclude actuation of the final trip actuation relay for Functions 1 and 2.</p> <p>Perform CHANNEL CALIBRATION.</p>	In accordance with the Surveillance Frequency Control Program
SR 3.3.5.3	<p>-----Note----- Response time testing shall include actuation of the final trip actuation relay.</p> <p>Verify ESF RESPONSE TIME within limit.</p>	In accordance with the Surveillance Frequency Control Program

No change on this page; provided for reference only.

LOP DG Start Instrumentation
3.3.5

Table 3.3.5-1 (page 1 of 1)
Loss of Power Diesel Generator Start Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRAIN	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	TRIP SETPOINT
1. 4.16 kV Emergency Bus Loss of Voltage DG Start	1,2,3,4, (a)	3	SR 3.3.5.1 SR 3.3.5.2 SR 3.3.5.3	≥ 3222 V and ≤ 3418 V	≥ 3255 V
2. 4.16 kV Emergency Bus Degraded Grid Voltage Actuation	1,2,3,4, (a)	3	SR 3.3.5.1 SR 3.3.5.2 SR 3.3.5.3	≥ 3638 V and ≤ 3749 V	≥ 3675 V
3. 4.16 kV Emergency Bus Degraded Grid Voltage Alarm	1,2,3,4	1	SR 3.3.5.1 SR 3.3.5.2	≥ 3835 V	≥ 3850 V

(a) When associated DG is required to be OPERABLE by LCO 3.8.2, "AC Sources - Shutdown."

Insert A – add to page 3.3.5-1

NOTES

1. For Unit 1, use Table 3.3.5-1 until Mode 4 entry following the spring 2018 outage (1R28); thereafter use Table 3.3.5-2.
2. For Unit 2, use Table 3.3.5-1 until Mode 4 entry following the fall 2017 outage (2R25); thereafter use Table 3.3.5-2.

Insert B – add on new page 3.3.5-5

Table 3.3.5-2 (page 1 of 1)
Loss of Power Diesel Generator Start Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRAIN	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	DELAY TIME
1. 4.16 kV Emergency Bus Loss of Voltage DG Start	1,2,3,4, (a)	3	SR 3.3.5.1 SR 3.3.5.2 SR 3.3.5.3	≥ 3222 V and ≤ 3418 V	NA
2. 4.16 kV Emergency Bus Degraded Grid Voltage Actuation	1,2,3,4, (a)	3	SR 3.3.5.1 SR 3.3.5.2 SR 3.3.5.3	Bus 1F: ≥ 3761 V Bus 1G: ≥ 3752 V Bus 2F: ≥ 3757 V Bus 2G: ≥ 3778 V	≤ 11.4 sec ≤ 11.4 sec ≤ 9.9 sec ≤ 9.9 sec

(a) When associated DG is required to be OPERABLE by LCO 3.8.2, "AC Sources - Shutdown."

**Joseph M. Farley Nuclear Plant, Units 1 and 2
Technical Specification 3.3.5
Loss of Power Diesel Generator Start Instrumentation
License Amendment Request**

Enclosure 3

FNP Units 1 and 2 Technical Specification 3.3.5

Clean Typed Pages

3.3 INSTRUMENTATION

3.3.5 Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation

LCO 3.3.5 The LOP instrumentation for each Function in Table 3.3.5-1 and Table 3.3.5-2 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.5-1 and Table 3.3.5-2.

NOTES

1. For Unit 1, use Table 3.3.5-1 until Mode 4 entry following the spring 2018 outage (1R28); thereafter use Table 3.3.5-2.
2. For Unit 2, use Table 3.3.5-1 until Mode 4 entry following the fall 2017 outage (2R25); thereafter use Table 3.3.5-2.

ACTIONS

NOTE

Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. NOTE Only applicable to Functions 1 and 2.</p> <hr/> <p>One or more functions with one channel per train inoperable.</p>	<p>A.1 NOTE The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels.</p> <hr/> <p>Place channel in trip.</p>	6 hours
<p>B. NOTE Only applicable to Functions 1 and 2.</p> <hr/> <p>One or more Functions with two or more channels per train inoperable.</p>	<p>B.1 Restore all but one channel per train to OPERABLE status.</p>	1 hour

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required Action and associated Completion Time of Condition A or B not met.	C.1 Enter applicable Condition(s) and Required Action(s) for the associated DG made inoperable by LOP DG start instrumentation.	Immediately
D. <u>NOTE</u> Only applicable to Function 3. One Alarm Function channel inoperable on one or more trains.	D.1 Verify voltage on associated bus is ≥ 3850 volts.	Once per 4 hours
E. Required Action and associated Completion Time of Condition D not met.	E.1 Restore bus voltage to ≥ 3850 volts.	1 hour
F. Required Action and associated Completion Time of Condition E not met.	F.1 Be in MODE 3. <u>AND</u> F.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.3.5.1</p> <hr/> <p style="text-align: center;">NOTES</p> <ol style="list-style-type: none"> 1. TADOT shall exclude actuation of the final trip actuation relay for LOP Functions 1 and 2. 2. Setpoint verification not required. <hr/> <p>Perform TADOT.</p>	<p>In accordance with the Surveillance Frequency Control Program</p>
<p>SR 3.3.5.2</p> <hr/> <p style="text-align: center;">NOTE</p> <p>CHANNEL CALIBRATION shall exclude actuation of the final trip actuation relay for Functions 1 and 2.</p> <hr/> <p>Perform CHANNEL CALIBRATION.</p>	<p>In accordance with the Surveillance Frequency Control Program</p>
<p>SR 3.3.5.3</p> <hr/> <p style="text-align: center;">Note</p> <p>Response time testing shall include actuation of the final trip actuation relay.</p> <hr/> <p>Verify ESF RESPONSE TIME within limit.</p>	<p>In accordance with the Surveillance Frequency Control Program</p>

No change on this page; provided for reference only.

Table 3.3.5-1 (page 1 of 1)
Loss of Power Diesel Generator Start Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRAIN	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	TRIP SETPOINT
1. 4.16 kV Emergency Bus Loss of Voltage DG Start	1,2,3,4, (a)	3	SR 3.3.5.1 SR 3.3.5.2 SR 3.3.5.3	≥ 3222 V and ≤ 3418 V	≥ 3255 V
2. 4.16 kV Emergency Bus Degraded Grid Voltage Actuation	1,2,3,4, (a)	3	SR 3.3.5.1 SR 3.3.5.2 SR 3.3.5.3	≥ 3638 V and ≤ 3749 V	≥ 3675 V
3. 4.16 kV Emergency Bus Degraded Grid Voltage Alarm	1,2,3,4	1	SR 3.3.5.1 SR 3.3.5.2	≥ 3835 V	≥ 3850 V

(a) When associated DG is required to be OPERABLE by LCO 3.8.2, "AC Sources - Shutdown."

Table 3.3.5-2 (page 1 of 1)
Loss of Power Diesel Generator Start Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRAIN	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	DELAY TIME
1. 4.16 kV Emergency Bus Loss of Voltage DG Start	1,2,3,4, (a)	3	SR 3.3.5.1 SR 3.3.5.2 SR 3.3.5.3	≥ 3222 V and ≤ 3418 V	NA
2. 4.16 kV Emergency Bus Degraded Grid Voltage Actuation	1,2,3,4, (a)	3	SR 3.3.5.1 SR 3.3.5.2 SR 3.3.5.3	Bus 1F: ≥ 3761 V Bus 1G: ≥ 3752 V Bus 2F: ≥ 3757 V Bus 2G: ≥ 3778 V	≤ 11.4 sec ≤ 11.4 sec ≤ 9.9 sec ≤ 9.9 sec

(a) When associated DG is required to be OPERABLE by LCO 3.8.2, "AC Sources - Shutdown."

**Joseph M. Farley Nuclear Plant, Units 1 and 2
Technical Specification 3.3.5
Loss of Power Diesel Generator Start Instrumentation
License Amendment Request**

Enclosure 4

FNP Units 1 and 2 Technical Specification 3.3.5 Bases

Marked-Up Pages

(unaffected pages are also provided for context)

B 3.3 INSTRUMENTATION

B 3.3.5 Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation

BASES

BACKGROUND

Successful operation of the required safety functions of the Engineered Safety Features (ESF) systems is dependent upon the availability of adequate power sources for energizing the various components such as pump motors, motor operated valves, and the associated control components. Offsite power is the preferred source of power for the 4.16 kV emergency buses which power the required ESF components. The LOP protection instrumentation monitors voltage on the F and G 4.16 kV buses. Each electrical train has independent LOP instrumentation and relay actuation logic for detecting degraded grid or loss of voltage conditions, and initiating an LOP emergency diesel generator (EDG) start signal. There are three LOP protection instrumentation actuation levels.

The first level of protection consists of a single independent channel providing a degraded grid voltage alarm. This alarm is set at $\geq 3850V$. This setpoint is based on detection of a degrading voltage condition where the bus voltage is below the minimum expected based on studies of the expected operation of the offsite power system. The alarm has a time delay to reduce the possibility of nuisance alarms for expected voltage transients.

for each 4.16 kV emergency bus as tabulated in Technical Specification 3.3.5.

delay

The second level is set at ~~$\geq 3675V$~~ . This level generates an LOP signal for sustained degraded grid voltage conditions. The ~~inverse time setting~~ prevents an unnecessary LOP by ensuring the existence of a sustained voltage inadequacy before actuation.

The third level is set at $\geq 3255V$. This level generates an LOP signal for near instantaneous loss of voltage conditions. The inverse time setting provides quick detection of a significant voltage inadequacy while preventing an unnecessary LOP for momentary power system disturbances.

The second and third levels provide LOP actuation signals. Each level consists of three undervoltage relays (i.e., channels) ~~with inverse time characteristics~~ arranged in a two-out-of-three logic. Actuation of either protection level will automatically disconnect the 4.16 kV emergency buses from the offsite power source. The loss of voltage sensors start the EDGs, and following the bus load shed, the Emergency Sequencer automatically reloads the bus.

(continued)

BASES

BACKGROUND
(continued)

The LOP instrumentation is also discussed in FSAR, Section 8.3 (Ref.1).

Alarm/Trip Setpoints and Allowable Values

The actual nominal Alarm/Trip Setpoint entered into the device is normally still more conservative than that required by the Allowable Value. If the measured setpoint does not exceed the Allowable Value, the relay is considered OPERABLE.

Setpoints adjusted in accordance with the Allowable Value ensure that the consequences of accidents will be acceptable, providing the unit is operated from within the LCOs at the onset of the accident and that the equipment functions as designed.

Allowable Values and/or Alarm/Trip Setpoints are specified for each Function in the LCO. Nominal Alarm or Trip Setpoints are also specified in the ~~unit-specific~~ setpoint calculations. The nominal setpoints are selected to ensure that the setpoint measured by the surveillance procedure does not exceed the Allowable Value if the device is performing as required. If the measured setpoint does not exceed the Allowable Value, the device is considered OPERABLE. Operation with an Alarm or Trip Setpoint less conservative than the nominal value, but within the Allowable Value, is acceptable provided that operation and testing is consistent with the assumptions of the ~~unit-specific~~ setpoint calculation.

Each Allowable Value and/or Alarm/Trip Setpoint specified is more conservative than the analytical limit specified in the voltage analyses to account for instrument uncertainties appropriate to the trip function. These uncertainties are defined in the ~~unit-specific~~ setpoint calculation (Ref. 3).

APPLICABLE
SAFETY ANALYSES

The LOP DG start instrumentation is required for the ESF Systems to function in any accident with a loss of offsite power. Its design basis is that of the ESF Actuation System (ESFAS).

Safety analyses credit the loading of the DG based on concurrent loss of offsite power and a loss of coolant accident (LOCA). The

(continued)

BASES

APPLICABLE
SAFETY ANALYSES
(continued)

actual DG start has historically been associated with the ESFAS actuation. The DG loading is included in the delay time associated with each safety system component requiring DG supplied power following a loss of offsite power.

For the 4.16 kV emergency buses to which Technical Specification Table 3.3.5-1 is applicable, an

Monitoring by the offsite power system grid operators and the first level LOP instrumentation (alarm) provide the primary protection for a degraded grid event. The degraded grid voltage alarm provides notification to control room operators that an abnormally low voltage condition exists on a 4.16 kV emergency bus. For slow acting transient conditions, the alarm setpoint allows for the initiation of manual actions by the offsite power system operator to restore normal bus voltage and protect required ESF LOCA loads from the low voltage condition without initiating an unnecessary automatic disconnect from the preferred offsite power source.

An administrative limit is established at a voltage level between the degraded grid voltage alarm allowable value (3835V) and the automatic degraded grid voltage actuation upper allowable value (3749V). Calculations verify that no ESF components require a 4.16kV bus voltage higher than the administrative limit to perform their safety functions. In the voltage range between the administrative limit and the degraded grid voltage actuation trip setpoint, a few ESF components may not have automatic protection from inadequate voltage. The manual actions provide the primary means of protecting these few ESF components from a sustained, slightly low voltage condition and all components from unnecessary automatic disconnection from the preferred offsite power source.

For the 4.16 kV emergency buses to which Technical Specification Table 3.3.5-2 is applicable, an analytical limit is established for each bus at a voltage level below the automatic degraded grid voltage actuation allowable value shown in Table 3.3.5-2. Calculations verify that no ESF components require a 4.16 kV bus voltage higher than the analytical limit to perform their safety functions.

The required channels of LOP DG start instrumentation, in conjunction with the ESF systems powered from the DGs, provide unit protection in the event of any of the analyzed accidents discussed in FSAR, Section 15 (Ref. 2), in which a loss of offsite power is assumed.

The delay times assumed in the safety analysis for the ESF equipment bound the 12 second DG start delay and include the appropriate sequencing delay, if applicable. The response times for ESFAS actuated equipment in LCO 3.3.2, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation," include the appropriate DG loading and sequencing delay.

The LOP DG start instrumentation channels satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

BASES

LCO

The LCO for LOP DG start instrumentation requires that three channels per train of both the loss of voltage and degraded grid voltage actuation Functions shall be OPERABLE in MODES 1, 2, 3, and 4 when the LOP DG start instrumentation supports safety systems associated with the ESFAS. In MODES 5 and 6, the three channels must be OPERABLE whenever the associated DG is required to be OPERABLE to ensure that the automatic start of the DG is available when needed. Loss of the LOP DG Start Instrumentation Function could result in the delay of safety systems initiation when required. This could lead to unacceptable consequences during accidents. During the loss of offsite power the DG powers the motor driven auxiliary feedwater pumps. Failure of these pumps to start would leave only one turbine driven pump, as well as an increased potential for a loss of decay heat removal through the secondary system.

In addition, the LCO requires one channel of the degraded grid alarm function per train of 4.16 kV emergency buses to be OPERABLE in MODES 1, 2, 3, and 4. The required alarm channels include the Digital Voltmeter Relay Contacts (LO-27V) on buses F and G and the associated alarm annunciators WE2, VE2 (Unit 1) and YE2, ZE2 (Unit 2). The alarm channels provide assurance that manual actions are taken to restore bus voltage and protect the required ESF LOCA loads from a degraded grid voltage condition.

APPLICABILITY

For the 4.16 kV emergency buses to which Technical Specification Table 3.3.5-1 is applicable, the

For the 4.16 kV emergency buses to which Technical Specification Table 3.3.5-2 is applicable, the degraded grid alarm is not a function included in the Technical Specifications.

The LOP DG Start Instrumentation Functions are required in MODES 1, 2, 3, and 4 because ESF Functions are designed to provide protection in these MODES. Actuation in MODE 5 or 6 is required whenever the required DG must be OPERABLE so that it can perform its function on an LOP or degraded power to the vital bus.

The degraded grid alarm function is required OPERABLE in MODES 1, 2, 3, and 4 to support the voltage requirements of the ESF loads required OPERABLE to mitigate a design basis LOCA. In MODES 5 and 6, the degraded grid alarm function is not required OPERABLE as no design basis LOCA is assumed to occur in these MODES and most of the ESF loads required to mitigate a design basis LOCA are not required OPERABLE.

BASES

ACTIONS

In the event a channel's Alarm or Trip Setpoint is found nonconservative with respect to the Allowable Value, or the channel is found inoperable, then the function that channel provides must be declared inoperable and the LCO Condition entered for the particular protection function affected.

Because the required channels are specified on a per train basis, the Condition may be entered separately for each train as appropriate.

A Note has been added in the ACTIONS to clarify the application of Completion Time rules. The Conditions of this Specification may be entered independently for each Function listed in the LCO. The Completion Time(s) of the inoperable channel(s) of a Function will be tracked separately for each Function starting from the time the Condition was entered for that Function.

A.1

Condition A applies to the LOP DG start Functions (Functions 1 and 2) with one loss of voltage or degraded grid voltage channel per train inoperable.

If one channel is inoperable, Required Action A.1 requires that channel to be placed in trip within 6 hours. With a channel in trip, the remaining LOP DG start instrumentation channels will provide a one-out-of-two logic to initiate a trip of the incoming offsite power.

A Note is added to Condition A indicating that it is only applicable to Functions 1 and 2.

A Note is added to allow bypassing an inoperable channel for up to 4 hours for surveillance testing of other channels. This allowance is made where bypassing the channel does not cause an actuation and where at least two other channels are monitoring that parameter.

The specified Completion Time and time allowed for bypassing one channel are reasonable considering the Function remains fully OPERABLE on each train and the low probability of an event occurring during these intervals.

B.1

Condition B applies to LOP Functions 1 and 2 when two or more loss of voltage or degraded voltage channels on a single train are inoperable.

(continued)

BASES

ACTIONS

B.1 (continued)

A Note is added to Condition B indicating that it is only applicable to Functions 1 and 2.

Required Action B.1 requires restoring all but one channel on a train to OPERABLE status. With a single inoperable channel remaining on a train, Condition A is applicable. The 1 hour Completion Time should allow ample time to repair most failures and takes into account the low probability of an event requiring an LOP start occurring during this interval.

C.1

Condition C applies to each of the LOP DG start Functions when the Required Action and associated Completion Time for Condition A or B are not met.

In these circumstances the Conditions specified in LCO 3.8.1, "AC Sources — Operating," or LCO 3.8.2, "AC Sources — Shutdown," for the DG made inoperable by failure of the LOP DG start instrumentation are required to be entered immediately. The actions of those LCOs provide for adequate compensatory actions to assure unit safety.

D.1

Condition D applies when the required degraded grid voltage alarm function is inoperable on one or both trains of emergency buses. The affected bus voltage associated with each inoperable alarm function must be verified ≥ 3850 volts every 4 hours. Frequent bus voltage verifications in lieu of an OPERABLE alarm effectively accomplish the same function as the alarm and allow operation to continue without the required alarm(s). A Note is added to Condition D indicating that it is only applicable to Function 3.

E.1

Condition E is applicable when the Required Action and associated Completion Time of Condition D is not met. If the voltage being verified per Required Action D.1 is < 3850 volts, action must be taken to restore the voltage to ≥ 3850 volts within one hour. The Completion Time of one hour is reasonable to ensure prompt action is taken to restore adequate voltage to the affected emergency bus(es).

(continued)

BASES

ACTIONS
(continued)

F.1 and F.2

Condition F becomes applicable when the Required Action and associated Completion Time of Condition E is not met. If the emergency bus voltage cannot be restored to ≥ 3850 volts within the Completion Time of Condition E, action must be taken to place the unit in a MODE where the LCO requirement for the Alarm function is not applicable. To achieve this status, the unit must be brought to MODE 3 within 6 hours and MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE
REQUIREMENTS

SR 3.3.5.1

SR 3.3.5.1 is the performance of a TADOT. The test checks trip devices that provide actuation signals directly, bypassing the analog process control equipment.

The TADOT surveillance is modified by two Notes. The first Note excludes the actuation of the final trip actuation relay for LOP Functions 1 and 2 from this TADOT. The actuation of this relay would cause the DG start and separation of the emergency buses from the grid. The actual DG start and connection to the emergency bus is verified by other surveillance testing (SR 3.3.5.3) accomplished during shutdown conditions. The second Note provides an exception to the verification of the LOP function setpoints during performance of this monthly TADOT. The TADOT includes verification of the undervoltage device operation upon removal of the input voltage and does not require the setpoint be verified or adjusted. The LOP function setpoints are verified during the CHANNEL CALIBRATION. In addition, the TADOT includes verification of the operation of the two-out-of-three logic associated with LOP Functions 1 and 2. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

Any change in the components being tested by this SR will require reevaluation of STI Evaluation Number 558904 in accordance with the Surveillance Frequency Control Program.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.5.2

SR 3.3.5.2 is the performance of a CHANNEL CALIBRATION.

The setpoints, as well as the response to a loss of voltage and a degraded grid voltage test, shall include a single point verification that the trip occurs within the required time delay (refer to appropriate relay setting sheet calibration requirements).

The CHANNEL CALIBRATION is a check of the major instrument components in the loop, including the sensor (relay or digital voltmeter). The test verifies that the channel responds to a measured parameter within the necessary range and accuracy.

The CHANNEL CALIBRATION is modified by a Note. The Note excludes the actuation of the final trip actuation relay for LOP functions 1 and 2 from this CHANNEL CALIBRATION. The actuation of this relay would cause the DG start and separation of the emergency buses from the grid. The actual DG start and connection to the emergency bus is verified by other surveillance testing (SR 3.3.5.3) accomplished during shutdown conditions.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.3.5.3

This SR ensures the individual channel response times are less than or equal to the maximum values assumed in the safety analysis. The response time testing acceptance criteria are included in FSAR Table 7.3-16. This surveillance is performed in accordance with the guidance provided in the ESF RESPONSE TIME surveillance requirement in LCO 3.3.2, ESFAS.

This surveillance is modified by a Note. The Note states that this surveillance shall include verification of the actuation of the final trip actuation relay associated with LOP Functions 1 and 2.

BASES

REFERENCES

1. FSAR, Section 8.3.
 2. FSAR, Chapter 15.
 3. SNC Calculations E-35.1.A, E-35.2.A, and SE-94-0470-006.
 4. FSAR, Section 7.3.
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and SJ-SNC529029-001

