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10 CFR 50.90

W3F1-2019-0073

October 24, 2019

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

Subject: License Amendment Request to Revise Technical Specification 3.8.1.1
Surveillance Requirements

Waterford Steam Electric Station, Unit 3 (Waterford 3)
NRC Docket No. 50-382
Renewed Facility Operating License No. NPF-38

Dear Sir or Madam:

Pursuant to 10 CFR 50.90, Entergy Operations, Inc. (Entergy) hereby requests an amendment to revise Technical Specification 3/4.8.1 (A.C. Sources – Operating) for Waterford Steam Electric Station, Unit 3 (Waterford 3). An evaluation of the existing Surveillance Requirements (SRs) identified errors in some criteria for voltage and frequency, some of which are deemed insufficient to protect the assumption in the safety basis. In addition, the proposed revision includes editorial changes to the SRs for consistency and clarity. The changes ensure compliance with the plant design basis and ensure that the Emergency Diesel Generators are capable of supplying power with the correct voltage and frequency to the required loads. Currently, the requirements are being administratively controlled under the provisions of NRC Administrative Letter (AL) 98-10, "Dispositioning of Technical Specifications that are Insufficient to Assure Plant Safety," since the existing values were determined to be non-conservative. This license amendment request (LAR) is submitted in accordance with the guidance in AL 98-10 as a required LAR to resolve a non-conservative Technical Specification.

The proposed change has been evaluated in accordance with 10 CFR 50.91(a)(1) using the criteria in 10 CFR 50.92(c); it was determined that the changes involve no significant hazards consideration. The bases for these determinations are included in the Enclosure.

Entergy requests approval of the proposed license amendment by November 30, 2020. Once approved, the amendment shall be implemented within 60 days.

This letter contains no new commitments.

In accordance with 10 CFR 50.91, Entergy is notifying the State of Louisiana of this License Amendment Request by transmitting a copy of this letter and enclosure to the designated State Official.

If there are any questions or if additional information is needed, please contact Paul Wood, Regulatory Assurance Manager, at 504-464-3786.

I declare under penalty of perjury that the foregoing is true and correct. Executed on October 24, 2019.

Respectfully,

A handwritten signature in black ink, appearing to read "Ron Gaston", with a long horizontal flourish extending to the right.

Ron Gaston

RWG/PW/mmz

Enclosure: Evaluation of the Proposed Change

Attachments to Enclosure:

Attachment 1: Revised (Markup) Technical Specifications Pages

Attachment 2: Revised (Clean) Technical Specifications Pages

cc: NRC Region IV Regional Administrator
NRC Senior Resident Inspector – Waterford Steam Electric Station, Unit 3
NRR Project Manager
Louisiana Department of Environmental Quality, Office of Environmental Compliance

Enclosure to

W3F1-2019-0073

Waterford Steam Electric Station, Unit 3

Evaluation of the Proposed Change

(15 Pages)

**Waterford Steam Electric Station, Unit 3
Evaluation of the Proposed Change**

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ATTACHMENTS:

Attachment 1: Revised (Markup) Technical Specifications Pages

Attachment 2: Revised (Clean) Technical Specifications Pages

1. SUMMARY DESCRIPTION

This evaluation supports a request to amend Renewed Facility Operating License No. NPF-38 for Waterford Steam Electric Station, Unit 3 (Waterford 3).

The proposed changes revise Technical Specification 3/4.8.1 (A. C. Sources – Operating) Surveillance Requirements (SR) 4.8.1.1.2.a.4, 4.8.1.1.2.a.6, 4.8.1.1.2.e.3, 4.8.1.1.2.e.4, 4.8.1.1.2.e.5, 4.8.1.1.2.e.5.a, 4.8.1.1.2.e.5.b, 4.8.1.1.2.e.6, and 4.8.1.1.2.g. An evaluation of the existing Technical Specification Surveillance Requirements (SRs) identified errors in some criteria for voltage and frequency, some of which are deemed insufficient to protect the assumption in the safety basis (described in Section 3. below). In addition, the proposed revision includes editorial changes to the SRs for consistency and clarity and a spelling error will be corrected.

The proposed changes ensure compliance with the plant design basis and ensure that the Emergency Diesel Generators are capable of supplying power with the correct voltage and frequency to the required loads.

Currently, the requirements are being administratively controlled under the provisions of NRC Administrative Letter (AL) 98-10, "Dispositioning of Technical Specifications that are Insufficient to Assure Plant Safety," since the existing Technical Specification frequency limits were determined to be non-conservative. This license amendment request (LAR) is submitted in accordance with the guidance in AL 98-10 as a required LAR to resolve a non-conservative Technical Specification.

2. DETAILED DESCRIPTION

Technical Specification 3.8.1.1 is proposed to be revised as described in the sections that follow.

Attachment 1 to this enclosure provides the existing Waterford 3 Technical Specification pages marked-up to show the proposed changes. Attachment 2 provides the clean typed Technical Specification pages with the proposed changes incorporated. When generating the clean typed Technical Specification pages, all of the content on the affected pages was re-typed in order to provide a consistent appearance.

Change #1: SR 4.8.1.1.2.a.4

The SR currently states:

4. Verifying the diesel starts**. The generator voltage and frequency shall be at least 3920 volts and 58.8 Hz in ≤ 10 seconds after the start signal. The steady state voltage and frequency shall be maintained at $4160 + 420, -240$ volts and 60 ± 1.2 Hz. The diesel generator shall be started for this test by using one of the following signals:

This is revised as follows:

4. Verifying the diesel generator starts** from standby condition and achieves:
 - a) In ≤ 10 seconds, voltage ≥ 3920 volts and frequency ≥ 58.8 Hz, and
 - b) Steady state voltage $4160 +420, -240$ volts, and frequency $60 +1.2, -0.3$ Hz.

The diesel generator shall be started for this test by using one of the following signals:

Explanation of proposed changes:

- 1) The existing steady state under-frequency limit of 58.8 Hz (60 -1.2 Hz) is increased to 59.7 Hz (60 -0.3 Hz). The current steady state under-frequency limit of 58.8 Hz (60 -1.2 Hz) is non-conservative. The value of 58.8 Hz is only applicable to diesel generator starting and loading transients, and does not apply to steady state operation. The revised value of 59.7 Hz is consistent with other SRs in Technical Specification 3.8.1.1 and is the correct value for the under-frequency limit which protects the assumptions in the safety basis. This follows the guidance in Regulatory Guide (RG) 1.9, Revision 4, "Selection, Design, Qualification, and Testing of Emergency Diesel Generator Units Used as Class 1E Onsite Electric Power Systems at Nuclear Power Plants" (Reference 8).
- 2) The SR is rewritten and reformatted to improve clarity. The changes are editorial and are based on the format of the Improved Standard Technical Specifications - Combustion Engineering Plants, Revision 4 (NUREG-1432).

Change #2: SR 4.8.1.1.2.a.6

The proposed change to this SR corrects the spelling from "busses" to "buses." This error was present in the Standard Technical Specifications for Combustion Engineering Pressurized Water Reactors (NUREG-0212), which is what the Waterford 3 Technical Specifications are based on. The proposed correction is consistent with the spelling used in NUREG-1432.

Change #3: SR 4.8.1.1.2.d and 4.8.1.1.2.e.1 and 4.8.1.1.2.e.2

This SRs is moved from page 3/4 8-5 to page 3/4 8-4 for editorial reasons. There are no proposed non-editorial changes to the content.

Change #4: SR 4.8.1.1.2.e.3

The SR currently states:

3. During shutdown, simulating a loss of offsite power by itself, and:
 - a) Verifying deenergization of the emergency busses and load shedding from the emergency busses.
 - b) Verifying the diesel starts on the auto start signal, energizes the emergency busses and the permanently connected loads within 10 seconds after the auto start signal, energizes the auto-connected shutdown loads through the load sequencer and operates for greater than or equal to 5 minutes while its generator is loaded with the shutdown loads. After energization, the steady-state voltage and frequency of the emergency busses shall be maintained at 4160+420, -240 volts and 60 +1.2, -0.3 Hz during this test.

This is revised to:

3. Verifying, during shutdown, on a simulated loss-of-offsite power signal by itself:
 - a) Deenergization of the emergency buses and load shedding from the emergency buses.
 - b) The diesel generator auto-starts from standby condition and:
 - i) Energizes the emergency buses and the permanently connected loads in ≤ 10 seconds,
 - ii) Energizes the auto-connected shutdown loads through the load sequencer,
 - iii) Operates for ≥ 5 minutes while loaded with the shutdown loads, and
 - iv) The steady-state voltage and frequency of the emergency buses shall be maintained at 4160 +420, -240 volts and 60 +1.2, -0.3 Hz during this test.

Explanation of proposed changes:

- 1) The SR is rewritten and reformatted to ensure consistency with similar changes being proposed in this LAR and to improve clarity. The changes are editorial and are based on the format of NUREG-1432.
- 2) The spelling is changed from "busses" to "buses" for the reason stated in Change #2.

Change #5: SR 4.8.1.1.2.e.4

The SR currently states:

4. Verifying that on an SIAS actuation test signal (without loss-of-offsite power) the diesel generator starts on the auto-start signal and operates on standby for greater than or equal to 5 minutes. The steady-state generator voltage and frequency shall be 4160 +420, -240 volts and 60 ± 1.2 Hz within 10 seconds after the auto-start signal; the generator voltage and frequency shall be maintained within these limits during this test.

This is revised to:

4. Verifying on an SIAS actuation test signal (without loss-of-offsite power) the diesel generator auto-starts from standby condition and:
 - a) Achieves, in ≤ 10 seconds after auto-start and during tests, voltage ≥ 3920 volts and frequency ≥ 58.8 Hz,
 - b) Achieves steady state voltage 4160 +420, -240 volts and frequency $60 +1.2, -0.3$ Hz,
 - c) Operates for ≥ 5 minutes.

Explanation of proposed changes:

- 1) The portion of the SR which states "The steady-state generator voltage and frequency shall be 4160 +420, -240 volts and 60 ± 1.2 Hz within 10 seconds after the auto-start signal" is revised into two requirements (a and b). As currently stated, the requirement to verify the minimum values to achieve when a diesel generator is started from a standby condition is combined with the steady state voltage and frequency criteria. Requirement a) satisfies verifying that the minimum voltage and frequency are achieved in the required time following receipt of a start signal. Requirement b) satisfies the criteria for verifying the diesel generator achieves steady state voltage and frequency. This follows the guidance in RG 1.9.
- 2) The steady state under-frequency limit is increased to 59.7 Hz (60 -0.3 Hz). The current steady state under-frequency limit of 58.8 Hz (60 -1.2 Hz) is non-conservative; this value is only applicable to diesel generator starting and loading transients, and does not apply to steady state operation. The revised limit of 59.7 Hz is consistent with other SRs in Technical Specification 3.8.1.1 and is the correct value for the under-frequency limit which protects the assumptions in the safety basis. This follows the guidance in in RG 1.9.
- 3) The SR is rewritten and reformatted to improve clarity. The changes are editorial and are based on the format of NUREG-1432.

Change #6: 4.8.1.1.2.e.5 and 4.8.1.1.2.e.5.a

The SR currently states:

5. During shutdown, simulating a loss-of-offsite power in conjunction with an SIAS actuation test signal, and:
 - a) Verifying deenergization of the emergency busses and load shedding from the emergency busses.

This is revised to:

5. Verifying, during shutdown, on a simulated loss-of-offsite power signal in conjunction with an SIAS actuation test signal:
 - a) Deenergization of the emergency buses and load shedding from the emergency buses.

Explanation of proposed changes:

- 1) The SR is moved from page 3/4 8-6 to page 3/4 8-5 for editorial reasons.
- 2) The SR is rewritten and reformatted to ensure consistency with similar changes being proposed in this LAR and to improve clarity. The changes are editorial and are based on the format of NUREG-1432.
- 3) The spelling is changed from “busses” to “buses” for the reason stated in Change #2.

Change #7: 4.8.1.1.2.e.5.b

The SR currently states:

- b) Verifying the diesel starts on the auto-start signal, energizes the emergency busses and the permanently connected loads within 10 seconds after the auto-start signal, energizes the auto-connected emergency loads through the load sequencer and operates for greater than or equal to 5 minutes. After energization, the steady-state voltage and frequency of the emergency busses shall be maintained at 4160 +420, -240 volts and 60 +1.2, -0.3 Hz during this test.

This is revised to:

- b) The diesel generator auto-starts from standby condition and:
 - i) Achieves, in ≤ 10 seconds, voltage ≥ 3920 volts and frequency ≥ 58.8 Hz,
 - ii) Energizes, in ≤ 10 seconds, the emergency buses and the permanently connected loads,
 - iii) Energizes the auto-connected emergency loads through the load sequencer,
 - iv) Achieves steady state voltage $4160 +420, -240$ volts,
 - v) Achieves steady state frequency $60 +1.2, -0.3$ Hz, and
 - vi) Operates for ≥ 5 minutes.

Explanation of proposed changes

- 1) The requirement, "Achieves, in ≤ 10 seconds, voltage ≥ 3920 volts and frequency ≥ 58.8 Hz," is added (requirement i) to verify the voltage and frequency are attained within acceptable limits and time. This follows the guidance in in RG 1.9.
- 2) The SR is rewritten and reformatted to improve clarity. These changes are editorial and are based on the format of NUREG-1432.
- 3) The spelling is changed from "busses" to "buses" for the reason stated in Change #2.

Change #8: 4.8.1.1.2.e.6

The SR currently states:

6. Verifying the diesel generator operates for an interval of not less than 24 hours. During 2 hours of this test, the diesel generator shall be loaded to an indicated 4700 to 4900 Kw* and during 22 hours of this test, the diesel generator shall be loaded to an indicated 4000 to 4400 Kw.* The generator voltage and frequency shall be $4160 +420, -240$ volts and 60 ± 1.2 Hz within 10 seconds after the start signal; the steady-state generator voltage and frequency shall be 4160 ± 420 volts and $60 +1.2, -0.3$ Hz during this test. Within 5 minutes after completing this 24-hour test, perform Surveillance Requirement 4.8.1.1.2.a.4.**

This is revised to:

6. Verifying the diesel generator operates for ≥ 24 hours:
 - a) For ≥ 2 hours loaded to an indicated 4700 to 4900 Kw* and
 - b) For the remaining hours of the test, loaded to an indicated 4000 to 4400 Kw.*
 - c) Verify the diesel generator starts and achieves, in ≤ 10 seconds, voltage ≥ 3920 volts and frequency ≥ 58.8 Hz.
 - d) Verify the diesel generator achieves steady state voltage $4160 + 420, -240$ volts, and frequency $60 + 1.2, -0.3$ Hz during this test.
 - e) Within 5 minutes after completing this 24-hour test, perform Surveillance Requirement 4.8.1.1.2.a.4.**

Explanation of proposed changes:

- 1) The portion of the SR which states “The steady-state generator voltage and frequency shall be $4160 + 420, -240$ volts and 60 ± 1.2 Hz within 10 seconds after the auto-start signal” is revised (requirement c) to verify the voltage and frequency are attained within acceptable limits and time. As currently written, the SR states the requirement as a range. The proposed change is consistent with the other start test SRs in Technical Specification 3.8.1.1 and follows the guidance in RG 1.9.
- 2) The current steady state under-voltage limit of 3740 volts ($4160 - 420$ volts) is increased to 3920 volts ($4160 - 240$ volts). This value is consistent with the other SRs in Technical Specification 3.8.1.1. The minimum voltage of 3920 volts ensures the degraded voltage relay will reset under the worst equipment drift and inaccuracy condition, as supported by Waterford 3 License Amendment No. 74 (Reference 10). License Amendment No. 74 revised the minimum voltage requirement for SRs 4.8.1.1.2.a.4, 4.8.1.1.2.e.1, 4.8.1.1.2.e.3.b, 4.8.1.1.2.e.4, 4.8.1.1.2.5.b, and 4.8.1.1.2.e.6 (the ready to load voltage specification); however the steady state voltage specification in SR 4.8.1.1.2.e.6 was not revised. The basis for License Amendment No. 74 was reviewed and it supports this proposed revision to the steady state under-voltage limit.
- 3) The SR is rewritten and reformatted to improve clarity. These changes are editorial and are based on the format of NUREG-1432.

Change #9: 4.8.1.1.2.e.7

The SR is moved from page 3/4 8-6 to page 3/4 8-6a for editorial reasons. There are no proposed changes to the content.

Change #10: 4.8.1.1.2.g

The SR currently states:

- g. In accordance with the Surveillance Frequency Control Program or after any modifications which could affect diesel generator interdependence by starting the diesel generators simultaneously, during shutdown, and verifying that the diesel generators accelerate to at least 600 rpm (60 ± 1.2 Hz) in less than or equal to 10 seconds.

This is revised to:

- g. In accordance with the Surveillance Frequency Control Program or after any modifications which could affect diesel generator interdependence, verify, when started simultaneously, during shutdown, from standby condition, each diesel generator achieves:
 - 1. In ≤ 10 seconds, voltage ≥ 3920 volts and frequency ≥ 58.8 Hz, and
 - 2. Steady state voltage $4160 +420, -240$ volts, and frequency $60 +1.2, -0.3$ Hz.

Proposed changes:

- 1) The portion of the SR which states "...verifying that the diesel generators accelerate to at least 600 rpm (60 ± 1.2 Hz) in less than or equal to 10 seconds" is revised (requirement 1) to verify the voltage and frequency are attained within acceptable limits and time. As currently written, the SR states the frequency requirement as a range, includes a corresponding value for speed (inconsistent with similar SRs), and does not include a voltage requirement. The proposed change is consistent with the other start test SRs in Technical Specification 3.8.1.1 and follows the guidance in RG 1.9.
- 2) The SR is revised to include a requirement that steady state voltage and frequency is achieved. This requirement is consistent with NUREG-1432.
- 3) The SR is rewritten and reformatted to improve clarity. These changes are editorial and are based on the format of NUREG-1432.

3. TECHNICAL EVALUATION

3.1 System Design and Operation

The Emergency Diesel Generator System is arranged in two separate divisions, each functionally identical to the other. The safety-related functions of each division of the system are as follows:

- a. To furnish power to the control and shutdown systems whenever an accident occurs and preferred power is unavailable in either or both divisions.
- b. To furnish power sufficient for a controlled shutdown of the plant whenever there is no accident but preferred power is lost in both divisions.

Each system carries out its purpose of supplying standby electrical power by starting on receipt of either a "manual" or "automatic" command signal, accelerating to rated speed, and accepting load as determined by the safety system requirements.

The engine is started by means of compressed air, and when sufficient speed is reached, fuel oil will be injected, and the engine will begin to operate as a diesel and will accelerate to a speed at which the starting air will be cut off. Further acceleration will bring the unit to its rated speed. The engine speed is controlled by the governor, which regulates the fuel oil supply to the engine injectors.

The rated speed and rated voltage of each Emergency Diesel Generator is 600 RPM/4160 V. Each unit is designed to attain rated speed and voltage within 10 seconds.

3.2 Current Licensing Basis and Evaluation

Calculation ECM05-003 Rev. 001 (Reference 2) determines the hydraulic performance of the High Pressure Safety Injection (HPSI) system and provides the basis for the surveillance requirements for the HPSI system. Calculation ECM98-068 Rev. 000 (Reference 3) determines the hydraulic performance of the Low Pressure Safety Injection (LPSI) system and provides the basis for the surveillance requirements for the LPSI system. These ensure that the minimum HPSI or LPSI Safety Analyses delivery assumptions are met. An assumption of these analyses is a diesel generator under-frequency of 0.3 Hz.

The allowable diesel generator under-frequency of 0.3 Hz is given in the remaining applicable SRs in Technical Specification 3.8.1.1. It was identified in 1984 (prior to initial criticality) (Reference 4) that the diesel generator under-frequency needed to be considered in the development of the HPSI flow requirements and therefore the diesel generator under-frequency limit of 0.3 was incorporated into these SRs as originally amended.

During the 2009 NRC Component Design Basis Inspection it was identified that the Emergency Feedwater (EFW) design basis flow calculation (MNQ10-1) (Reference 11) did not take into account all ranges of diesel frequency operation when determining EFW flow. Calculation MNQ10-1 was subsequently revised to account for a steady state diesel frequency of 59.7 Hz. Waterford 3 Condition Report CR-WF3-2008-5183 (Reference 12) includes an extent of condition action which investigated if the flow calculations for pumps operated by the Emergency Diesel Generators following a Loss of Offsite Power (LOOP) account for the lower

allowed diesel frequency of 59.7 Hz. It also investigated if the diesel under-frequency had the potential to result in the system not providing the required flow in a LOOP scenario. The review concluded that all pumps reviewed were shown to have adequate margin to the design basis required flow to account for the effects of the diesel generator under-frequency condition.

License Amendment 74 included a change to the minimum voltage specification in the Technical Specification 3.8.1.1 SRs. This change supported a revision of the reset values of the minimum voltage relay and assured that the minimum voltage output of the diesel generator is adequate before the bus loads are connected and the degraded voltage relays reset. The minimum voltage was changed from 3740 volts to 3920 volts. This change was made to ensure that the degraded voltage relay will reset under the worst equipment drift and inaccuracy conditions. The details of this change are included in the NRC's Safety Evaluation for License Amendment 74 (Reference 10).

4. REGULATORY EVALUATION

4.1 Applicable Regulatory Requirements/Criteria

The following regulations and guidance documents are applicable to the proposed change.

10 CFR 50.36, *Technical specifications*, subparagraph (c)(2)(ii)(C), *Criterion 3*, requires that a technical specification limiting condition for operation be established for a structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a design basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

10 CFR 50.36 subparagraph 50.36(c)(3), *Surveillance requirements* requires that Technical Specifications include SRs relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met.

10 CFR Part 50 Section 50.2 definitions "Design bases," means that information which identifies the specific functions to be performed by a structure, system, or component of a facility, and the specific values or ranges of values chosen for controlling parameters as reference bounds for design. These values may be (1) restraints derived from generally accepted "state of the art" practices for achieving functional goals, or (2) requirements derived from analysis (based on calculation and/or experiments) of the effects of a postulated accident for which a structure, system, or component must meet its functional goals.

General Design Criterion (GDC)-17, "Electric power systems," of Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50, requires, in part, that nuclear power plants have onsite and offsite electric power systems to permit the functioning of structures, systems, and components (SSCs) that are important to safety. The design of the alternating current electrical power system shall provide independence, redundancy, and testability to ensure an available source of power to the engineered safety features systems.

GDC-18, "Inspection and testing of electric power systems," states that electric power systems important to safety shall be designed to permit appropriate periodic inspection and testing of important areas and features, such as wiring, insulation, connections, and switchboards, to

assess the continuity of the systems and the condition of their components. The systems shall be designed with a capability to test periodically: (1) the operability and functional performance of the components of the systems, such as onsite power sources, relays, switches, and buses, and (2) the operability of the system as a whole and, under conditions as close to design as practical, the full operation sequence that brings the systems into operation, including operation of applicable portions of the protection system, and the transfer of power among the nuclear power unit, the offsite power system, and the onsite power system.

GDC-35 "Emergency core cooling" states that a system to provide abundant emergency core cooling shall be provided. The system safety function shall be to transfer heat from the reactor core following any loss of reactor coolant at a rate such that (1) fuel and clad damage that could interfere with continued effective core cooling is prevented and (2) clad metal-water reaction is limited to negligible amounts. The GDC also requires that suitable redundancy in components and features, and suitable interconnections, leak detection, isolation, and containment capabilities shall be provided to assure that for onsite electric power system operation (assuming offsite power is not available) and for offsite electric power system operation (assuming onsite power is not available) the system safety function can be accomplished, assuming a single failure.

Surveillance testing of the diesel generators is based on the guidance contained in RG 1.9, Revision 4, "Selection, Design, Qualification, and Testing of Emergency Diesel Generator Units Used as Class 1E Onsite Electric Power Systems at Nuclear Power Plants" (Reference 8). Section 1.4 states, in part, "The acceptance value of the frequency and voltage should be based on plant-specific analysis (where conservative values of voltage and frequency are measured) to prevent load interruption."

As discussed in Section 3.0 and 4.3, the changes provided in this LAR will ensure that the conclusions provided in the UFSAR remain valid, and the Emergency Diesel Generator and HPSI systems continue to comply with the regulation. The values are being changed to ensure that they protect the assumptions in the existing design basis which is in compliance with RG 1.9 guidance. With the proposed change, the Waterford 3 Technical Specifications will continue to include surveillance requirements related to diesel generator testing to assure the components are maintained, facility operations will be within safety limits, and the limiting conditions for diesel generator operation will be met.

Therefore, the proposed change does not affect compliance with these regulations or guidance and will ensure that the lowest functional capabilities or performance levels of equipment required for safe operation are met.

4.2 Precedent

The NRC has reviewed and approved similar license amendments for other nuclear plants that have revised Technical Specification voltage and/or frequency limits for EDG surveillance requirements. A specific example is provided by a license amendment for Prairie Island Nuclear Generating Plant Units 1 and 2. The amendment dated May 21, 2015 (ML15086A046) approved the proposed changes to the limits.

4.3 No Significant Hazards Consideration Determination Analysis

This License Amendment Request proposes the following changes for Technical Specification 3/4.8.1 (A. C. Sources – Operating):

The proposed changes revise Technical Specification 3/4.8.1 (A. C. Sources – Operating) Surveillance Requirements 4.8.1.1.2.a.4, 4.8.1.1.2.a.6, 4.8.1.1.2.e.3, 4.8.1.1.2.e.4, 4.8.1.1.2.e.5, 4.8.1.1.2.e.5.a, 4.8.1.1.2.e.5.b, 4.8.1.1.2.e.6, and 4.8.1.1.2.g. The changes ensure that the assumptions in the existing High and Low Pressure Safety Injection and Emergency Feedwater design bases are protected and follows the guidance in Regulatory Guide (RG) 1.9, Revision 4, “Selection, Design, Qualification, and Testing of Emergency Diesel Generator Units Used as Class 1E Onsite Electric Power Systems at Nuclear Power Plants”. Entergy has evaluated whether or not a significant hazards consideration is involved with the proposed change by focusing on the three standards set forth in 10 CFR 50.92, “Issuance of amendment,” as discussed below:

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No

The proposed changes conservatively revise frequency and voltage specifications and editorially revise the surveillance requirements. The changes are being made to either ensure that the assumptions in the analysis are maintained or are being made for editorial reasons; therefore, the proposed changes do not adversely affect accident initiators or precursors, and do not affect the design assumptions, conditions, or configuration of the plant, or the manner in which the plant is operated or maintained.

Therefore, 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 changes conservatively revise frequency and voltage specifications and editorially revise the surveillance requirements. The changes are being made to either ensure that the assumptions in the analysis are maintained or are being made for editorial reasons; therefore, the proposed changes do not involve a physical alteration of the plant (i.e., no new or different type of equipment will be installed) or a change in the methods governing normal plant operation. The diesel generator has historically been controlled at or above the under-frequency limit of 59.7 Hz and the under-voltage limit of 3920 volts. The changes do not alter assumptions made in the safety analysis but rather ensures that the diesel generator operates as assumed in the accident analysis. The proposed change would not affect the operation of safety related equipment assumed in the accident analyses, and would not create any new failure mechanisms, malfunctions, or accident initiators not considered in the design and licensing bases.

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

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

Response: No

The proposed changes conservatively revise the frequency and voltage specifications and editorially revise the surveillance requirements. The changes are being made to ensure that the assumptions in the analysis are maintained or are being made for editorial reasons. The bases for the existing lower frequency limit and lower voltage limit are not changed; therefore, no change is made to the accident analysis assumptions. Since the changes made are conservative, no margin of safety is reduced as part of this change.

Therefore, this change does not involve a significant reduction in a margin of safety.

Based on the above, Entergy 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.

4.4 Conclusions

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. ENVIRONMENTAL CONSIDERATION

A review has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. The proposed amendment has been evaluated for environmental considerations. The review has resulted in the determination that the proposed amendment would change requirements with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in 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, paragraph (b), no environmental impact statement or environmental assessment needs to be prepared in connection with the proposed amendment.

6. REFERENCES

1. NUREG-0973, "Technical Specifications Waterford Steam Electric Station, Unit No. 3, Docket No. 50-382, Appendix 'A' to License No. NPF-26," December 1984.
2. Entergy Calculation, Waterford Steam Electric Station, Unit 3, Design Engineering Calculation ECM05-003, Rev. 001, "High Pressure Safety Injection System Capacity."
3. Entergy Calculation, Waterford Steam Electric Station, Unit 3, Design Engineering Calculation ECM98-068, Rev. 000, "LPSI System Performance Surveillance Requirement Basis."
4. Entergy Letter to file, W3P84-0508, S. K. Shete to File, Waterford SES Unit No. 3 Minutes of Meeting on Technical Specification for HPSI Pumps," February 28, 1984.
5. NRC to Entergy, Waterford Steam Electric Station, Unit 3, Technical Specifications, through Amendment 250 [ADAMS Accession Number ML053130318].
6. Entergy, Waterford Steam Electric Station, Unit 3, Updated Final Safety Analysis Report (UFSAR), Revision 310.
7. Entergy, Waterford Steam Electric Station, Unit 3, Design Basis Document W3-DBD-002, "Emergency Diesel Generator and Automatic Load Sequencer Design Basis Document," Rev. 305, June 28, 2017.
8. Regulatory Guide 1.9, "Application and Testing of Safety-Related Diesel Generators in Nuclear Power Plants," Revision 4, March 2007.
9. NRC Administrative Letter 98-10, "Dispositioning of Technical Specifications that are Insufficient to Assure Plant Safety."
10. NRC letter to Entergy, "Issuance of Amendment No. 74 to Facility Operating License NPF-38 - Waterford Steam Electric Station, Unit 3 (TAC No. M83411), [ADAMS Accession Number ML021770163], August 24, 1992.
11. Entergy, Waterford Steam Electric Station, Unit 3, Design Engineering Calculation MNQ10-1, Rev. 003, "Emergency Feedwater System Head Curves."
12. Entergy, Waterford 3 Condition Report CR-WF3-2008-5183.

Enclosure Attachment 1 to

W3F1-2019-0073

Revised (Markup) Technical Specifications Pages

(8 Pages)

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS

4.8.1.1.1 Each of the above required independent circuits between the offsite transmission network and the onsite Class 1E distribution system shall be:

- a. Determined OPERABLE in accordance with the Surveillance Frequency Control Program by verifying correct breaker alignments, indicated power availability, and
- b. Demonstrated OPERABLE in accordance with the Surveillance Frequency Control Program by transferring manually and automatically unit power supply from the normal circuit to the alternate circuit.

4.8.1.1.2 Each diesel generator shall be demonstrated OPERABLE*:

- a. In accordance with the Surveillance Frequency Control Program by:
 1. Verifying the fuel level in the diesel oil feed tank,
 2. Deleted,
 3. Verifying the fuel transfer pump can be started and transfers fuel from the storage system to the diesel oil feed tank,

Replace with
Change #1

4. ~~Verifying the diesel starts**. The generator voltage and frequency shall be at least 3920 volts and 58.8 Hz in ≤ 10 seconds after the start signal. The steady state voltage and frequency shall be maintained at 4160 ± 420 , 240 volts and 60 ± 1.2 Hz. The diesel generator shall be started for this test by using one of the following signals:~~

- a) Manual.
- b) Simulated loss-of-offsite power by itself.
- c) Simulated loss-of-offsite power in conjunction with an ESF actuation test signal.
- d) An ESF actuation test signal by itself.

*All planned starts for the purpose of surveillance in this section may be preceded by a prelube period as recommended by the manufacturer.

**A modified diesel generator start involving idling and gradual acceleration to synchronous speed may be used for this surveillance requirement as recommended by the manufacturer. When modified start procedures are not used, the time, speed, voltage, and frequency tolerances of this surveillance requirement must be met.

ELECTRICAL POWER SYSTEM

SURVEILLANCE REQUIREMENTS (Continued)

Change #2:
correct
misspelling

5. Verifying the generator is synchronized, loaded to an indicated 4000-4400 Kw* in accordance with the manufacturer's recommendation and operates for at least an additional 60 minutes[#], and
 6. Verifying the diesel generator is aligned to provide standby power to the associated emergency busses.
- b. In accordance with the Surveillance Frequency Control Program and after each operation of the diesel where the period of operation was greater than or equal to 1 hour by checking for and removing accumulated water from the diesel oil feed tanks.
 - c. Deleted

*This band is meant as guidance to avoid routine overloading of the engine. Loads in excess of this band for special testing under direct monitoring of the manufacturer or momentary variation due to changing bus loads shall not invalidate the test.

[#]This surveillance requirement shall be preceded by and immediately follow without shutdown a successful performance of 4.8.1.1.2a.4 or 4.8.1.1.2d.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

Change #3:
Move to
page 3/4 8-4

- d. In accordance with the Surveillance Frequency Control Program a diesel generator fast start test shall be performed in accordance with TS 4.8.1.1.2a.4. Performance of the fast start test satisfies the testing requirements specified in TS 4.8.1.1.2a.4.
- e. In accordance with the Surveillance Frequency Control Program by:
 - 1. Verifying the generator capability to reject a load of greater than or equal to 498 kW while maintaining voltage at 4160 +420, -240 volts and frequency at 60 +4.5, -1.2 Hz.
 - 2. Verifying the generator capability to reject a load of an indicated 4000-4400 kW without tripping. The generator voltage shall not exceed 5023 volts during and following the load rejection.

Replace with
Change #4

- 3. ~~During shutdown, simulating a loss of offsite power by itself, and:~~
 - a) ~~Verifying deenergization of the emergency busses and load shedding from the emergency busses.~~
 - b) ~~Verifying the diesel starts on the auto start signal, energizes the emergency busses and the permanently connected loads within 10 seconds after the auto start signal, energizes the auto-connected shutdown loads through the load sequencer and operates for greater than or equal to 5 minutes while its generator is loaded with the shutdown loads. After energization, the steady-state voltage and frequency of the emergency busses shall be maintained at 4160 +420, -240 volts and 60 +1.2, -0.3 Hz during this test.~~

Replace with
Change #5

- 4. ~~Verifying that on an SIAS actuation test signal (without loss of offsite power) the diesel generator starts on the auto start signal and operates on standby for greater than or equal to 5 minutes. The steady state generator voltage and frequency shall be 4160 +420, -240 volts and 60 ± 1.2 Hz within 10 seconds after the auto start signal; the generator voltage and frequency shall be maintained within these limits during this test.~~

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

Move to
page 3/4 8-5
and replace
with Change #6

5. ~~During shutdown, simulating a loss of offsite power in conjunction with an SIAS actuation test signal, and~~

a) ~~Verifying deenergization of the emergency busses and load shedding from the emergency busses.~~

Replace with
Change #7

b) ~~Verifying the diesel starts on the auto-start signal, energizes the emergency busses and the permanently connected loads within 10 seconds after the auto-start signal, energizes the auto-connected emergency loads through the load sequencer and operates for greater than or equal to 5 minutes. After energization, the steady-state voltage and frequency of the emergency busses shall be maintained at 4160 +420, -240 volts and 60 +1.2, -0.3 Hz during this test.~~

c) Verifying that all automatic diesel generator trips, except engine overspeed and generator differential, are automatically bypassed upon loss of voltage on the emergency bus concurrent with a safety injection actuation signal.

Replace with
Change #8

6. ~~Verifying the diesel generator operates for an interval of not less than 24 hours. During 2 hours of this test, the diesel generator shall be loaded to an indicated 4700 to 4900 Kw* and during 22 hours of this test, the diesel generator shall be loaded to an indicated 4000 to 4400 Kw.* The generator voltage and frequency shall be 4160 +420, -240 volts and 60 ± 1.2 Hz within 10 seconds after the start signal; the steady-state generator voltage and frequency shall be 4160 ± 420 volts and 60 +1.2, -0.3 Hz during this test. Within 5 minutes after completing this 24-hour test, perform Surveillance Requirement 4.8.1.1.2.a.4.**~~

7. During shutdown, verifying that the auto-connected loads and permanently connected loads to each diesel generator do not exceed the 2000-hour rating of 4400 kW.

Change #9:
Move to
page 3/4 8-6a

*This band is meant as guidance to avoid routine overloading of the engine. Loads in excess of this band for special testing under direct monitoring of the manufacturer or momentary variation due to changing bus loads shall not invalidate the test.

**If Surveillance Requirement 4.8.1.1.2.a.4 is not satisfactorily completed, it is not necessary to repeat the preceding 24-hour test. Instead, the diesel generator may be operated at an indicated 4000-4400 kw* for 2 hours or until internal operating temperatures have stabilized. Within 5 minutes of securing the diesel generator, perform Surveillance Requirement 4.8.1.1.2.a.4.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

8. During shutdown, verifying the diesel generator's capability to:
 - a) Synchronize with the offsite power source while the generator is loaded with its emergency loads upon a simulated restoration of offsite power,
 - b) Transfer its loads to the offsite power source, and
 - c) Be restored to its standby status.
9. During shutdown, verifying that with the diesel generator operating in a test mode (connected to its bus), a simulated safety injection signal overrides the test mode by (1) returning the diesel generator to standby operation and (2) automatically energizes the emergency loads with offsite power.
10. Verifying that each fuel transfer pump transfers fuel to its associated diesel oil feed tank by taking suction from the opposite train fuel oil storage tank via the installed cross connect.
11. During shutdown, verifying that the automatic load sequence timer is OPERABLE with the time of each load block within $\pm 10\%$ of the sequenced load block time.
12. Verifying that the following diesel generator lockout features prevent diesel generator starting only when required:
 - a) turning gear engaged
 - b) emergency stop
 - c) loss of D.C. control power
 - d) governor fuel oil linkage tripped

f. Deleted

g. ~~In accordance with the Surveillance Frequency Control Program or after any modifications which could affect diesel generator interdependence by starting the diesel generators simultaneously, during shutdown, and verifying that the diesel generators accelerate to at least 600 rpm (60 ± 1.2 Hz) in less than or equal to 10 seconds.~~

h. Deleted

Replace with
Change #10

Change #1

4. Verifying the diesel generator starts** from standby condition and achieves:
 - a) In ≤ 10 seconds, voltage ≥ 3920 volts and frequency ≥ 58.8 Hz, and
 - b) Steady state voltage $4160 +420, -240$ volts, and frequency $60 +1.2, -0.3$ Hz.

The diesel generator shall be started for this test by using one of the following signals:

Change #4

3. Verifying, during shutdown, on a simulated loss-of-offsite power signal by itself:
 - a) Deenergization of the emergency buses and load shedding from the emergency buses.
 - b) The diesel generator auto-starts from standby condition and:
 - i) Energizes the emergency buses and the permanently connected loads in ≤ 10 seconds,
 - ii) Energizes the auto-connected shutdown loads through the load sequencer,
 - iii) Operates for ≥ 5 minutes while loaded with the shutdown loads, and
 - iv) The steady-state voltage and frequency of the emergency buses shall be maintained at $4160 +420, -240$ volts and $60 +1.2, -0.3$ Hz during this test.

Change #5

4. Verifying on an SIAS actuation test signal (without loss-of-offsite power) the diesel generator auto-starts from standby condition and:
 - a) Achieves, in ≤ 10 seconds after auto-start and during tests, voltage ≥ 3920 volts and frequency ≥ 58.8 Hz,
 - b) Achieves steady state voltage $4160 +420, -240$ volts and frequency $60 +1.2, -0.3$ Hz,
 - c) Operates for ≥ 5 minutes.

Change #6

5. Verifying, during shutdown, on a simulated loss-of-offsite power signal in conjunction with an SIAS actuation test signal:
 - a) Denergization of the emergency buses and load shedding from the emergency buses.

Change #7

- b) The diesel generator auto-starts from standby condition and:
 - i) Achieves, in ≤ 10 seconds, voltage ≥ 3920 volts and frequency ≥ 58.8 Hz,
 - ii) Energizes, in ≤ 10 seconds, the emergency buses and the permanently connected loads,
 - iii) Energizes the auto-connected emergency loads through the load sequencer,
 - iv) Achieves steady state voltage $4160 +420, -240$ volts,
 - v) Achieves steady state frequency $60 +1.2, -0.3$ Hz, and
 - vi) Operates for greater than or equal to 5 minutes.

Change #8

6. Verifying the diesel generator operates for ≥ 24 hours:
 - a) For ≥ 2 hours loaded to an indicated 4700 to 4900 Kw* and
 - b) For the remaining hours of the test, loaded to an indicated 4000 to 4400 Kw.*
 - c) Verify the diesel generator starts and achieves, in ≤ 10 seconds, voltage ≥ 3920 volts and frequency ≥ 58.8 Hz.
 - d) Verify the diesel generator achieves steady state voltage 4160 +420, -240 volts, and frequency 60 + 1.2, -0.3 Hz during this test.
 - e) Within 5 minutes after completing this 24-hour test, perform Surveillance Requirement 4.8.1.1.2.a.4.**

Change #10

- g. In accordance with the Surveillance Frequency Control Program or after any modifications which could affect diesel generator interdependence, verify, when started simultaneously, during shutdown, from standby condition, each diesel generator achieves:
 1. In ≤ 10 seconds, voltage ≥ 3920 volts and frequency ≥ 58.8 Hz, and
 2. Steady state voltage 4160 +420, -240 volts, and frequency 60 +1.2, -0.3 Hz.

Enclosure Attachment 2 to

W3F1-2019-0073

Revised (Clean) Technical Specifications Pages

(5 Pages)

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS

4.8.1.1.1 Each of the above required independent circuits between the offsite transmission network and the onsite Class 1E distribution system shall be:

- a. Determined OPERABLE in accordance with the Surveillance Frequency Control Program by verifying correct breaker alignments, indicated power availability, and
- b. Demonstrated OPERABLE in accordance with the Surveillance Frequency Control Program by transferring manually and automatically unit power supply from the normal circuit to the alternate circuit.

4.8.1.1.2 Each diesel generator shall be demonstrated OPERABLE*:

- a. In accordance with the Surveillance Frequency Control Program by:
 1. Verifying the fuel level in the diesel oil feed tank,
 2. Deleted,
 3. Verifying the fuel transfer pump can be started and transfers fuel from the storage system to the diesel oil feed tank,
 4. Verifying the diesel generator starts** from standby condition and achieves:
 - a) $In \leq 10$ seconds, voltage ≥ 3920 volts and frequency ≥ 58.8 Hz, and
 - b) Steady state voltage $4160 +420, -240$ volts, and frequency $60 +1.2, -0.3$ Hz.

The diesel generator shall be started for this test by using one of the following signals:

- a) Manual.
- b) Simulated loss-of-offsite power by itself.
- c) Simulated loss-of-offsite power in conjunction with an ESF actuation test signal.
- d) An ESF actuation test signal by itself.

* All planned starts for the purpose of surveillance in this section may be preceded by a prelube period as recommended by the manufacturer.

** A modified diesel generator start involving idling and gradual acceleration to synchronous speed may be used for this surveillance requirement as recommended by the manufacturer. When modified start procedures are not used, the time, speed, voltage, and frequency tolerances of this surveillance requirement must be met.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

5. Verifying the generator is synchronized, loaded to an indicated 4000-4400 Kw* in accordance with the manufacturer's recommendation and operates for at least an additional 60 minutes[#], and
 6. Verifying the diesel generator is aligned to provide standby power to the associated emergency buses.
- b. In accordance with the Surveillance Frequency Control Program and after each operation of the diesel where the period of operation was greater than or equal to 1 hour by checking for and removing accumulated water from the diesel oil feed tanks.
 - c. Deleted
 - d. In accordance with the Surveillance Frequency Control Program a diesel generator fast start test shall be performed in accordance with TS 4.8.1.1.2a.4. Performance of the fast start test satisfies the testing requirements specified in TS 4.8.1.1.2a.4.
 - e. In accordance with the Surveillance Frequency Control Program by:
 1. Verifying the generator capability to reject a load of greater than or equal to 498 kW while maintaining voltage at 4160 +420, -240 volts and frequency at 60 +4.5, -1.2 Hz.
 2. Verifying the generator capability to reject a load of an indicated 4000-4400 kW without tripping. The generator voltage shall not exceed 5023 volts during and following the load rejection.

* This band is meant as guidance to avoid routine overloading of the engine. Loads in excess of this band for special testing under direct monitoring of the manufacturer or momentary variation due to changing bus loads shall not invalidate the test.

This surveillance requirement shall be preceded by and immediately follow without shutdown a successful performance of 4.8.1.1.2a.4 or 4.8.1.1.2d.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

3. Verifying, during shutdown, on a simulated loss-of-offsite power signal by itself:
 - a) Deenergization of the emergency buses and load shedding from the emergency buses.
 - b) The diesel generator auto-starts from standby condition and:
 - i) Energizes the emergency buses and the permanently connected loads in ≤ 10 seconds,
 - ii) Energizes the auto-connected shutdown loads through the load sequencer,
 - iii) Operates for ≥ 5 minutes while loaded with the shutdown loads, and
 - iv) The steady-state voltage and frequency of the emergency buses shall be maintained at 4160 +420, -240 volts and 60 +1.2, -0.3 Hz during this test.
4. Verifying on an SIAS actuation test signal (without loss-of-offsite power) the diesel generator auto-starts from standby condition and:
 - a) Achieves, in ≤ 10 seconds after auto-start and during tests, voltage ≥ 3920 volts and frequency ≥ 58.8 Hz,
 - b) Achieves steady state voltage 4160 +420, -240 volts and frequency 60 +1.2, -0.3 Hz,
 - c) Operates for ≥ 5 minutes.
5. Verifying, during shutdown, on a simulated loss-of-offsite power signal in conjunction with an SIAS actuation test signal:
 - a) Denergization of the emergency buses and load shedding from the emergency buses.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- b) The diesel generator auto-starts from standby condition and:
 - i) Achieves, in ≤ 10 seconds, voltage ≥ 3920 volts and frequency ≥ 58.8 Hz,
 - ii) Energizes, in ≤ 10 seconds, the emergency buses and the permanently connected loads,
 - iii) Energizes the auto-connected emergency loads through the load sequencer,
 - iv) Achieves steady state voltage $4160 +420, -240$ volts,
 - v) Achieves steady state frequency $60 +1.2, -0.3$ Hz, and
 - vi) Operates for greater than or equal to 5 minutes.
 - c) Verifying that all automatic diesel generator trips, except engine overspeed and generator differential, are automatically bypassed upon loss of voltage on the emergency bus concurrent with a safety injection actuation signal.
6. Verifying the diesel generator operates for ≥ 24 hours:
- a) For ≥ 2 hours loaded to an indicated 4700 to 4900 Kw* and
 - b) For the remaining hours of the test, loaded to an indicated 4000 to 4400 Kw.*
 - c) Verify the diesel generator starts and achieves, in ≤ 10 seconds, voltage ≥ 3920 volts and frequency ≥ 58.8 Hz.
 - d) Verify the diesel generator achieves steady state voltage $4160 +420, -240$ volts, and frequency $60 + 1.2, -0.3$ Hz during this test.
 - e) Within 5 minutes after completing this 24-hour test, perform Surveillance Requirement 4.8.1.1.2.a.4.**

* This band is meant as guidance to avoid routine overloading of the engine. Loads in excess of this band for special testing under direct monitoring of the manufacturer or momentary variation due to changing bus loads shall not invalidate the test.

** If Surveillance Requirement 4.8.1.1.2.a.4 is not satisfactorily completed, it is not necessary to repeat the preceding 24-hour test. Instead, the diesel generator may be operated at an indicated $4000-4400$ kw* for 2 hours or until internal operating temperatures have stabilized. Within 5 minutes of securing the diesel generator, perform Surveillance Requirement 4.8.1.1.2.a.4

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

7. During shutdown, verifying that the auto-connected loads and permanently connected loads to each diesel generator do not exceed the 2000-hour rating of 4400 kW.
8. During shutdown, verifying the diesel generator's capability to:
 - a) Synchronize with the offsite power source while the generator is loaded with its emergency loads upon a simulated restoration of offsite power,
 - b) Transfer its loads to the offsite power source, and
 - c) Be restored to its standby status.
9. During shutdown, verifying that with the diesel generator operating in a test mode (connected to its bus), a simulated safety injection signal overrides the test mode by (1) returning the diesel generator to standby operation and (2) automatically energizes the emergency loads with offsite power.
10. Verifying that each fuel transfer pump transfers fuel to its associated diesel oil feed tank by taking suction from the opposite train fuel oil storage tank via the installed cross connect.
11. During shutdown, verifying that the automatic load sequence timer is OPERABLE with the time of each load block within $\pm 10\%$ of the sequenced load block time.
12. Verifying that the following diesel generator lockout features prevent diesel generator starting only when required:
 - a) turning gear engaged
 - b) emergency stop
 - c) loss of D.C. control power
 - d) governor fuel oil linkage tripped
- f. Deleted
- g. In accordance with the Surveillance Frequency Control Program or after any modifications which could affect diesel generator interdependence, verify, when started simultaneously, during shutdown, from standby condition, each diesel generator achieves:
 1. In ≤ 10 seconds, voltage ≥ 3920 volts and frequency ≥ 58.8 Hz, and
 2. Steady state voltage $4160 +420, -240$ volts, and frequency $60 +1.2, -0.3$ Hz.
- h. Deleted