TENNESSEE VALLEY AUTHORITY

1101 Market Street, Chattanooga, Tennessee 37402

CNL-24-018

June 25, 2024

10 CFR 50.90

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555 0001

Watts Bar Nuclear Plant, Units 1 and 2
Facility Operating Licenses Nos. NPF-90 and NPF-96
NRC Docket Nos. 50-390 and 50-391

Subject: **Watts Bar Nuclear Plant, Units 1 and 2 - License Amendment Request for Adoption of Technical Specification Task Force Traveler TSTF-276-A, Revision 2, Regarding TS 3.8.1 "AC Sources – Operating" to Clarify Requirements for Diesel Generator Testing (WBN-TS-24-01 and WBN-TS-24-02)**

In accordance with the provisions of Title 10 of the *Code of Federal Regulations* (10 CFR) 50.90, "Application for amendment of license, construction permit, or early site permit," Tennessee Valley Authority (TVA) is submitting a request for amendment to the Facility Operating License Nos. NPF-90 and NPF-96 for the Watts Bar Nuclear Plant (WBN), Units 1 and 2. The proposed change would revise certain surveillance requirements in WBN Units 1 and 2 Technical Specification (TS) 3.8.1, "AC Sources – Operating." Specifically, the proposed change would revise the notes to Surveillance Requirement (SR) 3.8.1.9, for the diesel generator (DG) single largest load rejection test, SR 3.8.1.10, for the DG full load rejection test, and SR 3.8.1.14, for the DG endurance and margin test, to require that these SRs be performed at a specified power factor of ≤ 0.9 with clarifications addressing situations when the power factor cannot be achieved. These proposed changes are consistent with Technical Specification Task Force Traveler TSTF-276-A, Revision 2, "Revise DG full load rejection test."

The proposed changes would also revise SR 3.8.1.10 and SR 3.8.1.14 to remove the surveillance kVAR ranges and modify the note to SR 3.8.1.18, verification of time delay setting for sequenced DG load blocks, to allow for the surveillance to be performed in Modes 1, 2, 3, or 4 to reestablish operability provided an assessment of plant safety is performed. These changes are identified as variations to TSTF-276-A, Revision 2, and are consistent with NUREG-1431, Standard Technical Specifications (STS), Westinghouse Plants, Revision 5.

The enclosure to this submittal provides a description and assessment of the proposed change, a regulatory evaluation, and a discussion of environmental considerations. Attachment 1 to the enclosure provides the existing WBN Unit 1 TS pages marked up to show the proposed change. Attachment 2 to the enclosure provides the existing WBN Unit 2 TS pages marked up to show the proposed change. Attachment 3 to the

enclosure provides the existing WBN Unit 1 TS Bases pages marked up to show the proposed change. Attachment 4 to the enclosure provides the existing WBN Unit 2 TS Bases pages marked up to show the proposed change. Changes to the existing TS Bases are provided for information only and will be implemented under the WBN TS Bases Control Program.

TVA has determined that there are no significant hazards considerations associated with the proposed change and that the TS change qualifies for a categorical exclusion from environmental review pursuant to the provisions of 10 CFR 51.22(c)(9). In accordance with 10 CFR 50.91(b)(1), TVA is sending a copy of this letter and enclosure to the Tennessee State Department of Environment and Conservation.

TVA requests approval of the proposed license amendment within one year from the date of this submittal with implementation within 90 days of issuance of the amendment.

There are no new regulatory commitments contained in this letter. Please address any questions regarding this request to Stuart L. Rymer, Senior Manager, Fleet Licensing, at slrymer@tva.gov.

I declare under penalty of perjury that the foregoing is true and correct. Executed on this 25th day of June 2024.

Respectfully,

Digitally signed by Edmondson, Carla
Date: 2024.06.25 21:30:03 -04'00'

Kimberly D. Hulvey
Director, Nuclear Regulatory Affairs

Enclosure: Evaluation of the Proposed Change

cc (Enclosure):

NRC Regional Administrator – Region II
NRC Senior Resident Inspector – Watts Bar Nuclear Plant
NRC Project Manager – Watts Bar Nuclear Plant
Director, Division of Radiological Health – Tennessee State Department of Environment and Conservation

Enclosure

Evaluation of the Proposed Change

Subject: Watts Bar Nuclear Plant, Units 1 and 2 - License Amendment Request for Adoption of Technical Specification Task Force Traveler TSTF-276-A, Revision 2, Regarding TS 3.8.1 “AC Sources – Operating” to Clarify Requirements for Diesel Generator Testing (WBN-TS-24-01 and WBN-TS-24-02)

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Enclosure

Evaluation of the Proposed Change

1.0 SUMMARY DESCRIPTION

In accordance with the provisions of Title 10 of the *Code of Federal Regulations* (10 CFR) 50.90, "Application for amendment of license, construction permit, or early site permit," Tennessee Valley Authority (TVA) is submitting a request for amendment to the Facility Operating License Nos. NPF-90 and NPF-96 for the Watts Bar Nuclear Plant (WBN), Units 1 and 2. The proposed change would revise certain surveillance requirements in WBN Units 1 and 2 Technical Specification (TS) 3.8.1, "AC Sources – Operating." Specifically, the proposed change would revise the notes to Surveillance Requirement (SR) 3.8.1.9, for the diesel generator (DG) single largest load rejection test, SR 3.8.1.10, for the DG full load rejection test, and SR 3.8.1.14, for the DG endurance and margin test, to require that these SRs be performed at a specified power factor of ≤ 0.9 with clarifications addressing situations when the power factor cannot be achieved. These proposed changes are consistent with Technical Specification Task Force Traveler TSTF-276-A, Revision 2, "Revise DG full load rejection test" (Reference 1).

The proposed changes would also revise SR 3.8.1.10 and SR 3.8.1.14 to remove the surveillance kVAR ranges and modify the note to SR 3.8.1.18, verification of time delay setting for sequenced DG load blocks, to allow for the surveillance to be performed in Modes 1, 2, 3, or 4 to reestablish operability provided an assessment of plant safety is performed. These changes are identified as variations to TSTF-276-A, Revision 2, and are consistent with NUREG-1431, Standard Technical Specifications (STS), Westinghouse Plants, Revision 5, (Reference 2).

2.0 DETAILED DESCRIPTION

2.1 Applicability of TSTF-276-A with Variations

TVA has reviewed TSTF-276-A, Revision 2, as approved by the NRC. This review included the NRC review information and comment resolutions for all revisions of TSTF-276. TVA has concluded that the justifications presented in TSTF-276-A, Revision 2, and the review information provided by the NRC staff are applicable and justify this amendment for the incorporation of the proposed change to the WBN Units 1 and 2 TS. The following is a description of revisions being proposed for WBN Units 1 and 2 TS 3.8.1 in accordance with TSTF-276-A, Revision 2.

- Note 2 to SR 3.8.1.9 is revised by removing the Note 2 lower end power factor limit of ≥ 0.8 and adding to Note 2: "However, if grid conditions do not permit, the power factor limit is not required to be met. Under this condition the power factor shall be maintained as close to the limit as practicable."

- SR 3.8.1.10 is revised by removing "operating at a power factor ≥ 0.8 and ≤ 0.9" from the surveillance. The existing "NOTE" is changed to "NOTES," adding "1.", to the existing note and adding Note 2: "If performed with DG synchronized with offsite power, it shall be performed at a power factor ≤ 0.9. However, if grid conditions do not permit, the power factor limit is not required to be met. Under this condition the power factor shall be maintained as close to the limit as practicable."

- SR 3.8.1.14 is revised by removing “operating at a power factor ≥ 0.8 and ≤ 0.9” from the surveillance. A new Note 4 is being added: “If performed with DG synchronized with offsite power, it shall be performed at a power factor ≤ 0.9. However, if grid conditions do not permit, the power factor limit is not required to be met. Under this condition the power factor shall be maintained as close to the limit as practicable.”

TVA is proposing the following variations from the TS change described in TSTF-276-A, Revision 2. TVA reviewed these variations and has concluded they do not affect the applicability of TSTF-276-A, Revision 2 to WBN Units 1 and 2. The variations proposed are consistent with NUREG-1431, Standard Technical Specifications (STS), Westinghouse Plants, Revision 5.

- SR 3.8.1.10 is revised by removing “and ≥ 2970 kVAR and ≤ 3300 kVAR” from the surveillance.

- SR 3.8.1.14 is revised by removing “and ≥ 3465 kVAR and ≤ 3630 kVAR” from 3.8.1.14.a and removing “and ≥ 2970 kVAR and ≤ 3300 kVAR” from 3.8.1.14.b.

- SR 3.8.1.18 is revised to add the word “normally” to the first sentence of the note to indicate “this Surveillance shall not normally be performed in MODE 1, 2, 3, or 4.” The note is further revised to add the sentence: “However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced.” The changes to the note to SR 3.8.1.18 are consistent with the wording of SR 3.8.1.8 Note 1 regarding the use of the word “normally”.

- The existing Notes in SR 3.8.1.14 differ from TSTF-276 and the STS but were approved by the NRC for WBN Unit 1 in Amendment 12 (Reference 7). Additionally, the existing Notes in SR 3.8.1.9, SR 3.8.1.10, and SR 3.8.1.18 differ from TSTF-276 and the STS, but were approved by the NRC for WBN Unit 1 in Amendment 89 (Reference 8). These same variations were incorporated into the initial TS for WBN Unit 2 (Reference 9). Minor TS page renumbering revisions are also made to the TS for WBN Unit 1 and 2 for SR 3.8.1.10.

Attachment 1 to the enclosure provides the existing WBN Unit 1 TS pages marked up to show the proposed change. Attachment 2 to the enclosure provides the existing WBN Unit 2 TS pages marked up to show the proposed change. Attachment 3 to the enclosure provides the existing WBN Unit 1 TS Bases pages marked up to show the proposed change. Attachment 4 to the enclosure provides the existing WBN Unit 2 TS Bases pages marked up to show the proposed change. Changes to the existing TS Bases are provided for information only and will be implemented under the WBN TS Bases Control Program.

2.2 System Design and Operation

The WBN Units 1 and 2 alternating current (AC) electrical power distribution system AC sources consist of the offsite power sources (preferred power sources, normal and alternate(s)), and the onsite standby power sources (Train A and Train B DGs). As required by 10 CFR 50, Appendix A, General Design Criteria (GDC) 17, the design of the AC electrical power system provides independence and redundancy to ensure an available source of power to the engineered safety feature (ESF) systems.

The onsite Class 1E AC distribution system supplies electrical power to four power trains, shared between the two units, with each train powered by an independent Class 1E 6.9 kilovolt (kV) shutdown board. Two DGs associated with one load group can provide the safety related functions to mitigate a loss-of-coolant accident (LOCA) in one unit and safely shutdown the opposite unit. Each 6.9 kV shutdown board has two separate and independent offsite sources of power as well as a dedicated onsite DG source.

The onsite standby power source for each 6.9 kV shutdown board is a dedicated DG. WBN uses four DG sets for Unit 1 operation. These same DGs are shared for Unit 2 operation. A DG starts automatically on a safety injection (SI) signal (i.e., low pressurizer pressure or high containment pressure signals) or on a 6.9 kV shutdown board degraded voltage or loss-of-voltage signal in accordance with TS 3.3.5, “Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation.” After the DG has started, it will automatically tie to its respective 6.9 kV shutdown board after offsite power is tripped as a consequence of 6.9 kV shutdown board loss-of-voltage or degraded voltage, independent of or coincident with a safety injection (SI) signal. The DGs will also start and operate in standby mode without tying to the 6.9 kV shutdown board on an SI signal alone. Following the trip of offsite power, a loss-of-voltage signal strips the non-permanent loads from the 6.9 kV shutdown board. When the DG is tied to the 6.9 kV shutdown board, loads are then sequentially connected to its respective 6.9 kV shutdown board by the automatic sequencer. The sequencing logic controls the permissive and starting signals to motor breakers to prevent overloading the DG by automatic load application.

In the event of a loss of preferred power, the 6.9 kV shutdown boards are automatically connected to the DGs in sufficient time to provide for safe reactor shutdown and to mitigate the consequences of a design basis accident (DBA) such as a LOCA.

Additional DG capabilities must be demonstrated to meet required surveillances, including SR 3.8.1.9 DG single largest load rejection test, SR 3.8.1.10 DG full load rejection test, and SR 3.8.1.14 DG endurance and margin test. SR 3.8.1.9 demonstrates the DG load response characteristics and capability to reject the largest single load while maintaining a specified margin to the overspeed trip. SR 3.8.1.10 demonstrates the DG capability to reject a full load, that is, maximum expected accident load, without overspeed tripping or exceeding the predetermined voltage limits. SR 3.8.1.14 requires demonstration that the DGs can start and run continuously at full load capability for an interval of not less than 24 hours (i.e., 22 hours of which is at a load equivalent to the continuous rating of the DG, and two hours of which is at a load equivalent to 110 percent (%) of the continuous duty rating of the DG). These surveillances are performed with the DG synchronized with offsite power. When the DG is not synchronized with offsite power, the power factor is determined by plant load and cannot be adjusted.

SR 3.8.1.18 demonstrates that sufficient load sequence time delay exists for the DG to restore frequency and voltage prior to applying the next load block and that safety analysis assumptions regarding ESF equipment time delays are not violated.

2.3 Current Technical Specifications Requirements

WBN Units 1 and 2 TS 3.8.1, “AC Sources - Operating,” specifically SR 3.8.1.9, SR 3.8.1.10, and SR 3.8.1.14, state that when a DG is synchronized with offsite power for load rejection or endurance and margin testing, the SR shall be performed at a power factor of ≥ 0.8 and ≤ 0.9. Additionally, SR 3.8.1.10 and SR 3.8.1.14 each have a required DG kilovolt-amperes reactive (kVAR) operating band during performance of the surveillance test. The SR 3.8.1.10 band is ≥ 2970 kVAR and ≤ 3300 kVAR for the entire surveillance test while the SR 3.8.1.14 band is

≥ 3465 kVAR and ≤ 3630 kVAR for the first 2 hours and then ≥ 2970 kVAR and ≤ 3300 kVAR for the remainder of the surveillance test. The note for SR 3.8.1.18 currently states that this surveillance shall not be performed in Mode 1, 2, 3, or 4 and that credit may be taken for unplanned events that satisfy this SR.

2.4 Reason for the Proposed Change

The requirement in SRs 3.8.1.9, 3.8.1.10, and 3.8.1.14 is that DG testing shall be performed at a power factor of ≥ 0.8 and ≤ 0.9. The proposed change ensures that the DG is tested under load conditions that are as close to design basis conditions as possible. When synchronized with offsite power, testing should be performed at a power factor of ≤ 0.9. This power factor is representative of the actual inductive loading a DG would see under design basis accident conditions. Under certain conditions, however, the added notes allow the surveillance to be conducted at a power factor other than ≤ 0.9. These conditions occur when grid voltage is high, and the additional field excitation needed to get the power factor to ≤ 0.9 results in voltages on the emergency busses that are too high. Under these conditions, the power factor should be maintained as close as practicable to 0.9 while still maintaining acceptable voltage limits on the emergency busses. In other circumstances, the grid voltage may be such that the DG excitation levels needed to obtain a power factor of 0.9 may not cause unacceptable voltages on the emergency busses, but the excitation levels are in excess of those recommended for the DG. In such cases, the power factor shall be maintained as close as practicable to 0.9 without exceeding the DG excitation limits. The change adds notes to address the power factor limits and is intended to improve clarity and ensure requirements are fully understood and consistently applied. This proposed change is consistent with the NRC approved TSTF-276-A, Revision 2.

The kVAR requirements in the WBN Units 1 and 2 SRs 3.8.1.10 and 3.8.1.14 were added during the development of the initial Unit 1 TS, which were subsequently incorporated into the initial Unit 2 TS. As noted in Justification 10 to Reference 6, the conclusion during WBN Unit 1 TS development was “Specification of the kVAR amount is a more appropriate test of the D/G capability than a range of power factors. If the power factor range is applied to both kW limits, this does not adequately verify D/G capability.” However, the kVAR bands in SR 3.8.1.10 and SR 3.8.1.14 create conflicting requirements as to the kW and power factor ranges allowed by the surveillances since they further limit the allowable kW and power factors within the ranges specified. There are also no requirements pertaining to kVAR testing identified in Regulatory Guide 1.9, “Selection, Design, Qualification, and Testing of Emergency Diesel Generator Units Used As Class 1E Onsite Electric Power Systems At Nuclear Power Plants,” which forms the regulatory basis for the surveillances. Therefore, the specification of a kVAR range in the current WBN Units 1 and 2 TS SR 3.8.1.10 and SR 3.8.1.14 is not required in order to demonstrate DG safety function. Additionally, application of kVAR requirements for the above DG surveillances has never been included in the Westinghouse STS. The changes being proposed will align the WBN Units 1 and 2 TS with the current regulatory requirements of NUREG-1431 Westinghouse STS, Revision 5, relative to DG surveillance testing.

The change to the note for SR 3.8.1.18 would allow performance of this the surveillance in Modes 1, 2, 3, or 4 to reestablish operability provided an assessment of plant safety is performed. This proposed change allows for flexibility in the performance of the surveillance with the appropriate considerations for the potential outcomes and transients associated with a failed surveillance, a successful surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the surveillance; as well as the operator procedures available to cope with these outcomes. This proposed change to SR 3.8.1.18 is consistent with the NUREG-1431 Westinghouse STS, Revision 5.

3.0 TECHNICAL EVALUATION

WBN Units 1 and 2 perform SR 3.8.1.9, SR 3.8.1.10, and SR 3.8.1.14 with the DG synchronized with offsite power. When the DG is synchronized with offsite power, a power factor of ≤ 0.9 is representative of the inductive loading a DG would experience under design basis accident conditions. When the DG is not synchronized with offsite power, the power factor is determined by plant load and cannot be adjusted. Also, adequate load may not be available, or it could be difficult to achieve the loads required by the surveillances.

A power factor of ≤ 0.9 should normally be able to be achieved when performing this surveillance test at power and synchronized with offsite power. Therefore, a power factor of ≤ 0.9 is desired when performing these surveillances. However, under certain grid conditions, this power factor may not be achievable. When grid voltage is higher than typical, the additional field excitation current required to achieve a power factor ≤ 0.9 results in ESF bus voltage exceeding the maximum steady state voltage limit. Increased grid voltage typically occurs when the plant is shutdown and the loads on the associated ESF transformer are too light to lower the voltage sufficiently to achieve a 0.9 power factor. Under these conditions, the power factor should be maintained as close as practicable to a 0.9 power factor while still maintaining acceptable voltage limits on the ESF busses. In other circumstances, the grid voltage may be such that the DG excitation levels needed to obtain a power factor of 0.9 may not cause unacceptable voltages on the emergency busses, but the excitation levels are greater than those recommended for the DG. In such cases, the power factor shall be maintained as close as practicable to 0.9 without exceeding DG excitation limits.

To confirm that the proposed power factor of ≤ 0.9 represents a worst case power factor for WBN Units 1 and 2, a review was performed of the calculated power factors for each DG during the limiting event of a loss of offsite power (LOOP) coincident with a LOCA. The maximum steady state DG running loads were considered for the first two hours of the event with automatic DG load sequencing only and also for the time period of two hours until the end of the event.

LOOP + LOCA Maximum DG Steady State Running Load – 0 hrs to 2 hrs

	DG 1A-A	DG 1B-B	DG 2A-A	DG 2B-B
kW	4313.57	4220.24	4194.17	4332.97
kVA	4969.12	4895.70	4819.42	4990.28
Power Factor	0.87	0.86	0.87	0.87

LOOP + LOCA Maximum DG Steady State Running Load – 2 hrs to End

	DG 1A-A	DG 1B-B	DG 2A-A	DG 2B-B
kW	4145.41	3771.84	4026.75	3887.39
kVA	4775.97	4374.71	4627.13	4472.04
Power Factor	0.87	0.86	0.87	0.87

The kW and kVA values listed are associated with the limiting LOOP with a LOCA event time and confirm that application of a ≤ 0.9 power factor is appropriate for WBN.

The proposed changes to SR 3.8.1.9, SR 3.8.1.10, and SR 3.8.1.14 to require that they be performed at a power factor of ≤ 0.9, if performed with the DG synchronized to offsite power unless grid conditions do not permit, are consistent with NRC approved traveler TSTF-276-A, Revision 2. The proposed changes require the DG to be tested under load conditions that are as close to design basis conditions as possible. Under certain conditions, however, the proposed changes allow the surveillance to be conducted at a power factor other than ≤ 0.9.

There exists a slight potential for failure of a surveillance test, but it would be limited to the DG that is being tested. Load test overload protection, when testing with the DG synchronized with the offsite power, is provided by a single unit solid state underfrequency relay. Should an offsite power anomaly occur that overloads the diesel generator during load testing, this relay acts to trip the Class 1E offsite source breakers while leaving the DG connected to the bus. The alternate DG will remain operable and in a standby condition during the performance of the SR and would not be susceptible to a common grid disturbance and a common cause failure. Furthermore, procedure precautions ensure that testing will not be performed under potentially adverse external plant conditions (such as storms, unstable grid conditions, and so forth).

The change to the note for SR 3.8.1.18 would allow performance of this surveillance in Modes 1, 2, 3, or 4 to reestablish operability provided an assessment of plant safety is performed. This proposed change allows for flexibility in the performance of the surveillance with the appropriate considerations for the potential outcomes and transients associated with a failed surveillance, a successful surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a plant shutdown and startup to determine that plant safety is maintained or enhanced when the surveillance is performed in MODE 1, 2, 3, or 4.

These changes do not significantly affect the ability of these surveillances to verify that the DG is capable of performing its safety function. Therefore, the proposed changes still afford adequate assurance of safety when judged against current regulatory standards.

4.0 REGULATORY EVALUATION

4.1 Applicable Regulatory Requirements and Criteria

Code of Federal Regulations

Section 182a of the Atomic Energy Act requires applicants for nuclear power plant operating licenses to include TS as part of the operating license application. The TS ensures the operational capability of structures, systems, and components that are required to protect the health and safety of the public. The Nuclear Regulatory Commission (NRC) requirements related to the content of the TS are contained in 10 CFR 50.36, which requires that the TS include items in the following specific categories: (1) safety limits, limiting safety system settings, and limiting control settings; (2) limiting conditions for operation; (3) surveillance requirements per 10 CFR 50.36(c)(3); (4) design features; and (5) administrative controls.

The regulations in 10 CFR 50.36(c)(3) specify that SRs are “requirements 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.”

General Design Criteria

WBN Units 1 and 2 were designed to meet the intent of the “Proposed General Design Criteria for Nuclear Power Plant Construction Permits” published in July 1967. The WBN construction permit was issued in January 1973. The WBN Updated Final Safety Analysis Report (UFSAR), however, addresses the GDC published as Appendix A to 10 CFR 50 in July 1971. Conformance with the GDC is described in Section 3.1.2 of the UFSAR.

Each criterion listed below is followed by a discussion of the design features and procedures that meet the intent of the criteria. Any exception to the 1971 GDC resulting from the earlier commitments is identified in the discussion of the corresponding criterion.

> *Criterion 17, "Electric Power Systems,"* requires that an onsite electric power system and an offsite electric power system shall be provided to permit functioning of structures, systems, and components important to safety. The onsite electric power supplies, including the batteries, and the onsite electric distribution system, shall have sufficient independence, redundancy, and testability to perform their safety functions assuming a single failure. In addition, this criterion requires provisions to minimize the probability of losing electric power from any of the remaining sources as a result of, or coincident with, the loss of power generated by the nuclear power unit, the loss of power from the transmission network, or the loss of power from the onsite electric power sources.
>
> *Criterion 18, "Inspection and Testing of Electric Power Systems,"* requires 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 systems 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.

Compliance with GDCs 17 and 18 are described in Section 3.1.2 of the WBN UFSAR.

Regulatory Guides

The onsite standby AC power systems at WBN Units 1 and 2 are also designed to comply with the following applicable regulations and requirements.

> *Regulatory Guide 1.6, Revision 0, "Independence Between Redundant Standby (Onsite) Power Sources and Between Their Distribution Systems,"* describes an acceptable degree of independence between redundant standby (onsite) power sources and between their distribution systems.
>
> *Regulatory Guide 1.9 (Revision 3), "Selection, Design, Qualification, and Testing of Emergency Diesel Generator Units Used As Class 1E Onsite Electric Power Systems At Nuclear Power Plants"* describes the selection, design, qualification, and testing of DGs.
>
> *Institute of Electrical and Electronics Engineers (IEEE) Standard 308-1971, "Criteria for Class 1E Power Systems for Nuclear Generating Stations,"* provides criteria for the determination of Class 1E power system design features and the requirements for their testing, surveillance, and documentation.

With the implementation of the proposed change, WBN Units 1 and 2 continue to meet the identified applicable GDC, regulations, and regulatory requirements.

4.2 Precedent

The proposed changes are similar to the following NRC-approved license amendments. TVA also reviewed the applicable NRC requests for additional information for the below license amendments.

- In Reference 3, NRC approved a license amendment for the Perry Nuclear Power Plant, Unit 1, which modified the notes in SR 3.8.1.9, 3.8.1.10, and 3.8.1.14 to be consistent with TSTF-276-A, Revision 2. The revised notes allow the SRs to be performed at a specified power factor with clarifications addressing situations when the power factor cannot be achieved.
- In Reference 4, NRC approved a license amendment for the Wolf Creek Generating Station, which revised SRs 3.8.1.10 and 3.8.1.14, to add a new note to SR 3.8.1.10 and SR 3.8.1.14, consistent with TSTF-276-A, Revision 2. The revised Notes allow the full load rejection test and endurance and margin test to be performed at the specified power factor with clarifications addressing situations when the power factor cannot be achieved.
- In Reference 5, the NRC approved a license amendment for the Palo Verde Nuclear Generating Station, Units 1, 2, and 3, which revises SRs 3.8.1.9, 3.8.1.10, and 3.8.1.14 to (1) allow these SRs to be performed, or partially performed, in reactor modes that currently are not allowed by the TS, and (2) require that SRs 3.8.1.10 and 3.8.1.14 be performed at a power factor of ≤ 0.89 if performed with the emergency DGs synchronized to the grid unless grid conditions do not permit.

These approved precedent TS changes are similar to the change proposed in this LAR.

4.3 No Significant Hazards Consideration

Tennessee Valley Authority (TVA) is requesting a license amendment request (LAR) to Facility Operating License Nos. NPF-90 for Watts Bar Nuclear Plant (WBN), Unit 1 and NPF-96 for WBN Unit 2. The proposed change would modify the notes to TS Surveillance Requirements (SR) 3.8.1.9, diesel generator (DG) single largest load rejection test, 3.8.1.10, DG full load rejection test, and 3.8.1.14, DG endurance and margin test, to require that these SRs be performed at a specified power factor of ≤ 0.9 with clarifications addressing situations when the power factor cannot be achieved. The proposed change would also modify the note to SR 3.8.1.18 to allow for the surveillance to be performed in Modes 1, 2, 3, or 4 to reestablish operability provided an assessment of plant safety measured against the avoided risk of a plant shutdown and startup to determine that plant safety is maintained or enhanced when the surveillance is performed. This change is consistent with NUREG-1431, Standard Technical Specifications, Westinghouse Plants, Revision 5, and Technical Specification Task Force (TSTF)-276-A, Revision 2.

TVA has evaluated whether a significant hazards consideration is involved with the proposed amendments by focusing on the three standards set forth in Title 10 of the *Code of Federal Regulations* (10 CFR) 50.92, “Issuance of amendment,” as discussed below.

1. *Does the proposed amendment involve a significant increase in the probability or consequence of an accident previously evaluated?*

   Response: No

Performing a surveillance that tests the DG is not a precursor of any accident previously evaluated. Relaxing the requirement to maintain a specific power factor limit when synchronized with offsite power does not significantly affect the method of performing the surveillances such that the probability of an accident would be affected. The changes only affect surveillances of mitigative equipment and, therefore, do not have an impact on the probability of an accident previously evaluated. The performance of the subject surveillances ensures that mitigative equipment is capable of performing its intended function, and therefore, the changes do not involve a significant increase in the consequences of an accident previously evaluated.

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

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

   Response: No.

   No new accident scenarios, failure mechanisms, or limiting single failures are introduced as a result of the proposed changes. The systems, structures, and components previously required for the mitigation of a transient remain capable of fulfilling their intended design functions. The proposed changes have no adverse effects on a safety-related systems or components and do not challenge the performance or integrity of safety related systems. As such, the changes do not introduce a mechanism for initiating a new or different accident than those described in the Updated Final Safety Analysis Report.

   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 amendment involve a significant reduction in a margin of safety?*

   Response: No.

   The proposed changes will continue to ensure the DGs are able to perform their design function as assumed in calculations that evaluate their function during design basis accidents. The proposed changes to the testing requirements for the plant DGs do not affect the operability requirements for the DGs, as verification of such operability will continue to be performed as required. Continued verification of operability supports the capability of the DGs to perform their required function of providing emergency power to engineered safety feature systems. Only one DG is tested at a time and the remaining DG will be available to safely shut down the plant or respond to a design basis accident, if required. In addition, the proposed change involves no changes to safety setpoints or limits established or assumed by the accident analysis.

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

Based on the above, TVA concludes that the proposed amendment does not involve a 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 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 Nuclear Regulatory 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

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. 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 effluents 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(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

6.0 REFERENCES

1. Technical Specification Task Force Improved Standard Technical Specifications Change Traveler TSTF-276-A, Revision 2, "Revise DG full load rejection test."

2. NUREG 1431, Revision 5, Standard Technical Specifications (STS) Westinghouse Plants.

3. NRC letter to Energy Harbor Nuclear Corp., “Perry Nuclear Power Plant, Unit No. 1 – Issuance of Amendment No. 202 to Adopt Technical Specification Task Force TSTF-276, Revision 2, ‘Revise DG Full Load Rejection Test’ (EPID L-2023-LLA-0079),” dated February 21, 2024 (ML23353A001)

4. NRC letter to Wolf Creek Nuclear Operating Corporation, “Wolf Creek Generating Station – Issuance of Amendment Re: Revise Technical Specification Surveillance Requirements 3.8.1.10 and 3.8.1.14 (CAC No. MF6754),” dated April 15, 2016 (ML16081A194)

5. NRC letter to Arizona Public Service Company, “Palo Verde Nuclear Generating Station, Units 1, 2, and 3 – Issuance of Amendments Re: AC Sources - Operating Surveillance Requirements (TAC Nos. MD2831, MD2832, and MD2833),” dated May 16, 2007 (ML071060321)

6. TVA letter to NRC, “Watts Bar Nuclear Plant (WBN) Unit 1 – Comments on the Proof and Review Technical Specifications,” dated June 4, 1993 (ML073230460, ML073190382 and ML073190383)

7. NRC letter to TVA, “Issuance of Amendment on Diesel Generator Systems Testing (TAC NO. M98919),” dated October 19, 1998 (ML020780203)

8. NRC letter to TVA, “Watts Bar Nuclear Plant, Unit 1 – Issuance of Amendment Regarding Technical Specification 3.8.1, “AC (Alternating Current) Sources – Operating” Surveillance Requirements Notes (TAC NO. ME6980),” dated November 22, 2011 (ML11234A258)

9. NRC letter to TVA, “Issuance of Facility Operating License No. NPF-96, Watts Bar Nuclear Plant Unit 2,” dated October 22, 2015 (ML15251A587)

Enclosure

Attachment 1

Proposed TS Change (Mark-Ups) for WBN Unit 1

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.9	----------NOTES---------- 1. For DGs 1A-A and 1B-B, this Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR. 2. If performed with the DG synchronized with offsite power, it shall be performed at a power factor ~~≥ 0.8 and ~~≤ 0.9. However, if grid conditions do not permit, the power factor limit is not required to be met. Under this condition the power factor shall be maintained as close to the limit as practicable. ---------- Verify each DG rejects a load greater than or equal to its associated single largest post-accident load, and: a. Following load rejection, the frequency is ≤ 66.75 Hz; b. Within 3 seconds following load rejection, the voltage is ≥ 6555 V and ≤ 7260 V; and c. Within 4 seconds following load rejection, the frequency is ≥ 59.8 Hz and ≤ 60.1 Hz.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.10	----------NOTES---------- 1. For DGs 1A-A and 1B-B, this Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR. ~~1.~~2. If performed with DG synchronized with offsite power, it shall be performed at a power factor ≤ 0.9. However, if grid conditions do not permit, the power factor limit is not required to be met. Under this condition the power factor shall be maintained as close to the limit as practicable. --- Verify each DG ~~operating at a power factor ≥ 0.8 and ≤ 0.9~~ does not trip and voltage is maintained ≤ 8880 V during and following a load rejection of ≥ 3960 kW and ≤ 4400 kW ~~and ≥ 2970 kVAR and ≤ 3300 kVAR~~.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.13	----------NOTE---------- For DGs 1A-A and 1B-B, this Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR. ---------- Verify each DG's automatic trips are bypassed on automatic or emergency start signal except: a. Engine overspeed; and b. Generator differential current.	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.14	----------NOTES---------- 1. Momentary transients outside the load and power factor ranges do not invalidate this test. 2. For performance of this test in MODE 1, 2, 3 or 4, three DGs must be maintained operable and in a standby condition. 3. Credit may be taken for unplanned events that satisfy this SR. 4. If performed with DG synchronized with offsite power, it shall be performed at a power factor ≤ 0.9. However, if grid conditions do not permit, the power factor limit is not required to be met. Under this condition the power factor shall be maintained as close to the limit as practicable. ---------- Verify each DG ~~operating at a power factor ≥ 0.8 and ≤ 0.9~~ operates for ≥ 24 hours: a. For ≥ 2 hours loaded ≥ 4620 kW and ≤ 4840 kW~~ and ≥ 3465 kVAR and ≤ 3630 kVAR~~; and b. For the remaining hours of the test loaded ≥ 3960 kW and ≤ 4400 kW~~ and ≥ 2970 kVAR and ≤ 3300 kVAR~~.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.17	----------NOTE---------- This Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this SR. ---------- Verify, with each Unit 1 DG operating in test mode and connected to its bus, an actual or simulated ESF actuation signal overrides the test mode by: a. Returning DG to ready-to-load operation; and b. Automatically energizing the emergency load from offsite power.	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.18	----------NOTE---------- For DGs 1A-A and 1B-B, this Surveillance shall not normally be performed in MODE 1, 2, 3, or 4. However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. Credit may be taken for unplanned events that satisfy this SR. ---------- Verify the time delay setting for each sequenced load block is within limits for each accident condition and non-accident condition load sequence.	In accordance with the Surveillance Frequency Control Program

(continued)

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Attachment 2

Proposed TS Change (Mark-Ups) for WBN Unit 2

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
3.8.1.9	----------NOTE---------- 1. For DGs 2A-A and 2B-B, this Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR. 2. If performed with the DG synchronized with offsite power, it shall be performed at a power factor ~~≥ 0.8 and~~ ≤ 0.9. However, if grid conditions do not permit, the power factor limit is not required to be met. Under this condition the power factor shall be maintained as close to the limit as practicable. ---------- Verify each DG rejects a load greater than or equal to its associated single largest post-accident load, and: a. Following load rejection, the frequency is ≤ 66.75 Hz; b. Within 3 seconds following load rejection, the voltage is ≥ 6555 V and ≤ 7260 V; and c. Within 4 seconds following load rejection, the frequency is ≥ 59.8 Hz and ≤ 60.1 Hz.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.10	----------NOTES---------- 1. For DGs 2A-A and 2B-B, this Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR. ~~1.~~2. If performed with DG synchronized with offsite power, it shall be performed at a power factor ≤ 0.9. However, if grid conditions do not permit, the power factor limit is not required to be met. Under this condition the power factor shall be maintained as close to the limit as practicable. ---------- Verify each DG ~~operating at a power factor ≥ 0.8 and ≤ 0.9~~ does not trip and voltage is maintained ≤ 8880 V during and following a load rejection of ≥ 3960 kW and ≤ 4400 kW ~~and ≥ 2970 kVAR and ≤ 3300 kVAR~~.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.14	----------NOTES---------- 1. Momentary transients outside the load and power factor ranges do not invalidate this test. 2. For performance of this test in MODE 1, 2, 3 or 4, three DGs must be maintained operable and in a standby condition. 3. Credit may be taken for unplanned events that satisfy this SR. 4. If performed with DG synchronized with offsite power, it shall be performed at a power factor ≤ 0.9. However, if grid conditions do not permit, the power factor limit is not required to be met. Under this condition the power factor shall be maintained as close to the limit as practicable. ---------- Verify each DG ~~operating at a power factor ≥ 0.8 and ≤ 0.9~~ operates for ≥ 24 hours: a. For ≥ 2 hours loaded ≥ 4620 kW and ≤ 4840 kW ~~and ≥ 3465 kVAR and ≤ 3630 kVAR~~; and b. For the remaining hours of the test loaded ≥ 3960 kW and ≤ 4400 kW ~~and ≥ 2970 kVAR and ≤ 3300 kVAR~~.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.15	----------NOTES---------- This Surveillance shall be performed within 5 minutes of shutting down the DG after the DG has operated ≥ 2 hours loaded ≥ 3960 kW and ≤ 4400 kW. Momentary transients outside of load range do not invalidate this test. ---------- Verify each DG starts and achieves, in ≤ 10 seconds, voltage ≥ 6800 V, and frequency ≥ 58.8 Hz. Verify after DG fast start from standby conditions that the DG achieves steady state voltage ≥ 6800 V and ≤ 7260 V, and frequency ≥ 59.8 Hz and ≤ 60.1 Hz.	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.16	----------NOTE---------- For DGs 2A-A and 2B-B, this Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this SR. ---------- Verify each DG: a. Synchronizes with offsite power source while loaded with emergency loads upon a simulated restoration of offsite power; b. Transfers loads to offsite power source; and c. Returns to ready-to-load operation.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.17	----------NOTE---------- For DGs 2A-A and 2B-B, this Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this SR. ---------- Verify, DG 2A-A and 2B-B operating in test mode and connected to its bus, an actual or simulated ESF actuation signal overrides the test mode by: a. Returning DG to ready-to-load operation; and b. Automatically energizing the emergency load from offsite power.	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.18	----------NOTE---------- For DGs 2A-A and 2B-B, this Surveillance shall not normally be performed in MODE 1, 2, 3, or 4. However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. Credit may be taken for unplanned events that satisfy this SR. ---------- Verify the time delay setting for each sequenced load block is within limits for each accident condition and non-accident condition load sequence.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
SR 3.8.1.19	----------NOTE---------- For DGs 2A-A and 2B-B, this Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this SR. ---------- Verify on an actual or simulated loss of offsite power signal in conjunction with an actual or simulated ESF actuation signal: a. De-energization of emergency buses; b. Load shedding from emergency buses; and c. DG auto-starts from standby condition and: 1. energizes permanently connected loads in ≤ 10 seconds, 2. energizes auto-connected emergency loads through load sequencer, 3. achieves steady state voltage: ≥ 6800 V and ≤ 7260 V, 4. achieves steady state frequency ≥ 59.8 Hz and ≤ 60.1 Hz, and 5. supplies permanently connected and auto-connected emergency loads for ≥ 5 minutes.	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.20	Verify during idle operation that any automatic or emergency start signal disables the idle start circuitry and commands the engine to full speed.	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.21	Verify when started simultaneously from standby condition, each DG achieves, in ≤ 10 seconds, voltage ≥ 6800 V and frequency ≥ 58.8 Hz. Verify after DG fast start from standby conditions that the DG achieves steady state voltage ≥ 6800 V and ≤ 7260 V, and frequency ≥ 59.8 Hz and ≤ 60.1 Hz.	In accordance with the Surveillance Frequency Control Program

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Attachment 3

Proposed TS Bases Change (Mark-Ups) for WBN Unit 1

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.9 (continued)

trip. The largest single load for each DG is the essential raw cooling water pump at 800 HP. This Surveillance may be accomplished by: 1) tripping the DG output breaker with the DG carrying greater than or equal to its associated single largest post accident load while paralleled to offsite power or while solely supplying the bus, or 2) tripping its associated single largest post accident load with the DG solely supplying the bus. As required by Regulatory Guide 1.9, C1.4 (Ref. 3), the load rejection test is acceptable if the increase in diesel speed does not exceed 75% of the difference between synchronous speed and the overspeed trip setpoint, or 15% above synchronous speed, whichever is lower.

The time and voltage tolerances specified in this SR are derived from Regulatory Guide 1.9 (Ref. 3) recommendations for response during load sequence intervals. The 3 seconds specified is equal to 60% of a typical 5 second load sequence interval associated with sequencing of the largest load. The voltage and maximum transient frequency specified are consistent with the design range of the equipment powered by the DG. SR 3.8.1.9.a corresponds to the maximum frequency excursion, while SR 3.8.1.9.b and SR 3.8.1.9.c are steady state voltage and frequency values to which the system must recover following load rejection. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

This SR is modified by two Notes. The reason for Note 1 is that during operation with the reactor critical, performance of this SR for DG 1A-A or 1B-B could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, plant safety systems. Credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include:

1) Unexpected operational events which cause the equipment to perform the function specified by this Surveillance, for which adequate documentation of the required performance is available; and

2) Post corrective maintenance testing that requires performance of this Surveillance in order to restore the component to OPERABLE, provided the maintenance was required, or performed in conjunction with maintenance required to maintain OPERABILITY or reliability.

Note 2 ensures that the DG is tested under load conditions that are as close to design basis conditions as possible. When synchronized with offsite power, testing should be performed at a power factor of ≤ 0.9. This power factor is representative of the actual inductive loading a DG would see under design basis accident conditions. Under certain conditions, however, Note 2 allows the Surveillance to be conducted at a power factor other than ≤ 0.9. These conditions occur when grid voltage is high, and the additional field excitation needed to get the power factor to ≤ 0.9 results in voltages on the emergency boards that are too high. Under these conditions, the power factor should be

(continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.1.9 (continued)

maintained as close as practicable to 0.9 while still maintaining acceptable voltage limits on the emergency boards. In other circumstances, the grid voltage may be such that the DG excitation levels needed to obtain a power factor of 0.9 may not cause unacceptable voltages on the emergency boards, but the excitation levels are in excess of those recommended for the DG. In such cases, the power factor shall be maintained as close as practicable to 0.9 without exceeding the DG excitation limits.
~~In order to ensure that the DG is tested under load conditions that are as close to design basis conditions as possible, Note 2 requires that, if synchronized to offsite power testing must be performed using a power factor ≥ 0.8 and ≤ 0.9. This power factor is chosen to be representative of the actual design basis inductive loading that the DG would experience~~

SR 3.8.1.10

This Surveillance demonstrates the DG capability to reject a full load without overspeed tripping or exceeding the predetermined voltage limits. The DG full load rejection may occur because of a system fault or inadvertent breaker tripping. This Surveillance ensures proper engine generator load response under the simulated test conditions. This test simulates the loss of the total connected load that the DG experiences following a full load rejection and verifies that the DG does not trip upon loss of the load. These acceptance criteria provide for DG damage protection. While the DG is not expected to experience this transient during an event and continues to be available, this response ensures that the DG is not degraded for future application, including reconnection to the bus if the trip initiator can be corrected or isolated.

~~In order to ensure that the DG is tested under load conditions that are as close to design basis conditions as possible, testing must be performed using a power factor ≥ 0.8 and ≤ 0.9. This power factor is chosen to be representative of the actual design basis inductive loading that the DG would experience.~~

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

This SR is modified by ~~a~~two Notes. ~~The~~ The reason for ~~the~~ Note 1 is that during operation with the reactor critical, performance of this SR for DG 1A-A or 1B-B could cause perturbation to the electrical distribution systems that could challenge continued steady state operation and, as a result, plant safety systems. Credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include:

1) Unexpected operational events which cause the equipment to perform the function specified by this Surveillance, for which adequate documentation of the required performance is available; and

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SURVEILLANCE REQUIREMENTS

SR 3.8.1.10 (continued)

2) Post corrective maintenance testing that requires performance of this Surveillance in order to restore the component to OPERABLE, provided the maintenance was required, or performed in conjunction with maintenance required to maintain OPERABILITY or reliability.

Note 2 ensures that the DG is tested under load conditions that are as close to design basis conditions as possible. When synchronized with offsite power, testing should be performed at a power factor of ≤ 0.9. This power factor is representative of the actual inductive loading a DG would see under design basis accident conditions. Under certain conditions, however, Note 2 allows the Surveillance to be conducted at a power factor other than ≤ 0.9. These conditions occur when grid voltage is high, and the additional field excitation needed to get the power factor to ≤ 0.9 results in voltages on the emergency boards that are too high. Under these conditions, the power factor should be maintained as close as practicable to 0.9 while still maintaining acceptable voltage limits on the emergency boards. In other circumstances, the grid voltage may be such that the DG excitation levels needed to obtain a power factor of 0.9 may not cause unacceptable voltages on the emergency boards, but the excitation levels are in excess of those recommended for the DG. In such cases, the power factor shall be maintained as close as practicable to 0.9 without exceeding the DG excitation limits.

SR 3.8.1.11

As required by Regulatory Guide 1.9 (Ref. 3), paragraph C2.2.4, this Surveillance demonstrates the as designed operation of the standby power sources during loss of the offsite source. This test verifies all actions encountered from the loss of offsite power, including shedding of the nonessential loads and energization of the emergency buses and respective loads from the DG. It further demonstrates the capability of the DG to automatically achieve the required voltage and frequency within the specified time.

The DG autostart time of 10 seconds is derived from requirements of the accident analysis to respond to a design basis large break LOCA. The Surveillance should be continued for a minimum of 5 minutes in order to demonstrate that all starting transients have decayed and stability is achieved.

The requirement to verify the connection and power supply of permanent and autoconnected loads is intended to satisfactorily show the relationship of these loads to the DG loading logic. In certain circumstances, many of these loads cannot actually be connected or loaded without undue hardship or potential for undesired operation. For instance, Emergency Core Cooling Systems (ECCS) injection valves are not desired to be stroked open, or high pressure injection systems are not capable of being operated at full flow, or residual heat removal (RHR) systems performing a decay heat removal function are not desired to be realigned to the ECCS mode of operation. In lieu of actual demonstration of

(continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.1.11 (continued)

connection and loading of loads, testing that adequately shows the capability of the DG systems to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

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

For the purpose of this testing, the DGs shall be started from standby conditions, that is, with the engine coolant and oil being continuously circulated and temperature maintained consistent with manufacturer recommendations. The DG engines for WBN have an oil circulation and soakback system that operates continuously to preclude the need for a prelube and warmup when a DG is started from standby.

This SR is modified by a Note. The reason for the Note is that performing the Surveillance for DG 1A-A or 1B-B would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include:

1) Unexpected operational events which cause the equipment to perform the function specified by this Surveillance, for which adequate documentation of the required performance is available; and

2) Post corrective maintenance testing that requires performance of this Surveillance in order to restore the component to OPERABLE, provided the maintenance was required, or performed in conjunction with maintenance required to maintain OPERABILITY or reliability.

SR 3.8.1.12

This Surveillance demonstrates that the DG automatically starts and achieves the required voltage and frequency within the specified time (10 seconds) from the design basis actuation signal (LOCA signal) and operates for $\geq$ 5 minutes. The minimum voltage and frequency stated in the SR are those necessary to ensure the DG can accept DBA loading while maintaining acceptable voltage and frequency levels. Stable operation at the nominal voltage and frequency values is also essential to establishing DG OPERABILITY, but a time constraint is not imposed. This is because a typical DG will experience a period of voltage and frequency oscillations prior to reaching steady state operation if these oscillations are not dampened out by load application. This period may extend beyond the 10 second acceptance criteria and could be a cause for failing the SR. In lieu of a time constraint in the SR, WBN will monitor and trend the actual time to reach steady state operation as a means of ensuring there is no voltage regulator or governor degradation which could cause a DG to become inoperable. The

(continued)

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SURVEILLANCE REQUIREMENTS

SR 3.8.1.12 (continued)

5 minute period provides sufficient time to demonstrate stability. Since the Unit 2 DGs only carry the common load required for the loss of offsite power event, this anticipatory test would only start the Unit 1 DGs. SR 3.8.1.12.d and SR 3.8.1.12.e ensure that permanently connected loads and emergency loads are energized from the offsite electrical power system on an ESF signal without loss of offsite power.

The requirement to verify the connection of permanent and autoconnected loads is intended to satisfactorily show the relationship of these loads to the DG loading logic. In certain circumstances, many of these loads cannot actually be connected or loaded without undue hardship or potential for undesired operation. For instance, ECCS injection valves are not desired to be stroked open, or high pressure injection systems are not capable of being operated at full flow, or RHR systems performing a decay heat removal function are not desired to be realigned to the ECCS mode of operation. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the DG system to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

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

For the purpose of this testing, the DGs shall be started from standby conditions, that is, with the engine coolant and oil being continuously circulated and temperature maintained consistent with manufacturer recommendations. The DG engines for WBN have an oil circulation and soakback system that operates continuously to preclude the need for a prelube and warmup when a DG is started from standby.

This SR is modified by a Note. The reason for the Note is that during operation with the reactor critical, performance of this Surveillance could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, plant safety systems. Credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include:

1) Unexpected operational events which cause the equipment to perform the function specified by this Surveillance, for which adequate documentation of the required performance is available; and

2) Post corrective maintenance testing that requires performance of this Surveillance in order to restore the component to OPERABLE, provided the maintenance was required, or performed in conjunction with maintenance required to maintain OPERABILITY or reliability.

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SURVEILLANCE REQUIREMENTS

SR 3.8.1.13

This Surveillance demonstrates that DG noncritical protective functions (e.g., high jacket water temperature) are bypassed on an automatic or emergency start signal and that critical protective functions (engine overspeed and generator differential current) remain functional to affect a DG trip to avert substantial damage to the DG unit or to the safety related equipment powered by the DG. It is not necessary to actually trip the DG using critical protective functions in order to satisfy this SR. The noncritical trips are bypassed during DBAs and provide an alarm on an abnormal engine condition. This alarm provides the operator with

sufficient time to react appropriately. The DG availability to mitigate the DBA is more critical than protecting the engine against minor problems that are not immediately detrimental to emergency operation of the DG.

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

The SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove DG 1A-A or 1B-B from service. Credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include:

1) Unexpected operational events which cause the equipment to perform the function specified by this Surveillance, for which adequate documentation of the required performance is available; and

3) Post corrective maintenance testing that requires performance of this Surveillance in order to restore the component to OPERABLE, provided the maintenance was required, or performed in conjunction with maintenance required to maintain OPERABILITY or reliability.

SR 3.8.1.14

Regulatory Guide 1.9 (Ref. 3), paragraph C2.2.9, requires demonstration that the DGs can start and run continuously for an interval of not less than 24 hours, $\geq$ 2 hours of which is at a load between 105% and 110% of the continuous duty rating and the remainder of the time at a load equivalent to 90-100% of the continuous duty rating of the DG. The DG starts for this Surveillance can be performed either from standby or hot conditions. The provisions for prelubricating and warmup, discussed in SR 3.8.1.2, and for gradual loading, discussed in SR 3.8.1.3, are applicable to this SR.

~~In order to ensure that the DG is tested under load conditions that are as close to design conditions as possible, testing must be performed using a power factor of $\geq$ 0.8 and $\leq$ 0.9. This power factor is chosen to be representative of the actual design basis inductive loading that the DG would experience. The load band is provided to avoid routine overloading of the DG. Routine overloading may result~~

(continued)

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SURVEILLANCE REQUIREMENTS

SR 3.8.1.14 (continued)

~~in more frequent teardown inspections in accordance with vendor recommendations in order to maintain DG OPERABILITY.~~

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

This Surveillance is modified by ~~three~~ four Notes. Note 1 states that momentary transients due to changing bus loads do not invalidate this test. Similarly, momentary power factor transients above the power factor limit will not invalidate the test. Note 2 establishes that this SR may be performed on only one DG at a time while in MODE 1, 2, 3, or 4. This is necessary to ensure the proper response to an operational transient (i.e., loss of offsite power, ESF actuation). Therefore, three DGs must be maintained operable and in a standby condition during performance of this test. In this configuration, the plant will remain within its design basis, since at all times safe shutdown can be achieved with two DGs in the same train.

Note 3 establishes that credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include:

1) Unexpected operational events which cause the equipment to perform the function specified by this Surveillance, for which adequate documentation of the required performance is available; and

2) Post corrective maintenance testing that requires performance of this Surveillance in order to restore the component to OPERABLE, provided the maintenance was required, or performed in conjunction with maintenance required to maintain OPERABILITY or reliability.

Note 4 ensures that the DG is tested under load conditions that are as close to design basis conditions as possible. When synchronized with offsite power, testing should be performed at a power factor of ≤ 0.9. This power factor is representative of the actual inductive loading a DG would see under design basis accident conditions. Under certain conditions, however, Note 4 allows the Surveillance to be conducted at a power factor other than ≤ 0.9. These conditions occur when grid voltage is high, and the additional field excitation needed to get the power factor to ≤ 0.9 results in voltages on the emergency boards that are too high. Under these conditions, the power factor should be maintained as close as practicable to 0.9 while still maintaining acceptable voltage limits on the emergency boards. In other circumstances, the grid voltage may be such that the DG excitation levels needed to obtain a power factor of 0.9 may not cause unacceptable voltages on the emergency boards, but the excitation levels are in excess of those recommended for the DG. In such cases, the power factor shall be maintained close as practicable to 0.9 without exceeding the DG excitation limits.

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SURVEILLANCE REQUIREMENTS

SR 3.8.1.14 (continued)

Prior to performance of this SR in Modes 1 or 2, actions are taken to establish that adequate conditions exist for performance of the SR. The required actions are defined in Bases Table 3.8.1-2.

SR 3.8.1.15

This Surveillance demonstrates that the diesel engine can restart from a hot condition, such as subsequent to shutdown from normal Surveillances, and achieve the required voltage and frequency within 10 seconds. The minimum voltage and frequency stated in the SR are those necessary to ensure the DG can accept DBA loading while maintaining acceptable voltage and frequency levels. Stable operation at the nominal voltage and frequency values is also essential to establishing DG OPERABILITY, but a time constraint is not imposed. This is because a typical DG will experience a period of voltage and frequency oscillations prior to reaching steady state operation if these oscillations are not dampened out by load application. This period may extend beyond the 10 second acceptance criteria and could be a cause for failing the SR. In lieu of a time constraint in the SR, WBN will monitor and trend the actual time to reach steady state operation as a means of ensuring there is no voltage regulator or governor degradation which could cause a DG to become inoperable. The 10 second time is derived from the requirements of the accident analysis to respond to a design basis large break LOCA. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

The DG engines for WBN have an oil circulation and soakback system that operates continuously to preclude the need for a prelube and warmup when a DG is started from standby.

This SR is modified by a Note to ensure that the test is performed with the diesel sufficiently hot. The load band is provided to avoid routine overloading of the DG. Routine overloads may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain DG OPERABILITY. The requirement that the diesel has operated for at least 2 hours at full load conditions prior to performance of this Surveillance is based on manufacturer recommendations for achieving hot conditions. Momentary transients due to changing bus loads do not invalidate this test.

SR 3.8.1.16

As required by Regulatory Guide 1.9 (Ref. 3), paragraph C2.2.11, this Surveillance ensures that the manual synchronization and automatic load transfer from the DG to the offsite source can be made and the DG can be returned to ready to load status when offsite power is restored. It also ensures that the autostart logic is reset to allow the DG to reload if a subsequent loss of offsite power occurs. The DG is considered to be in ready to load status when the DG is at rated speed and voltage, the output breaker is open and can receive

(continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.1.16 (continued)

an autoclose signal on bus undervoltage, and the load sequence timers are reset.

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

This SR is modified by a Note. The reason for the Note is that performing the Surveillance for DG 1A-A or 1B-B would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include:

1) Unexpected operational events which cause the equipment to perform the function specified by this Surveillance, for which adequate documentation of the required performance is available; and

2) Post corrective maintenance testing that requires performance of this Surveillance in order to restore the component to OPERABLE, provided the maintenance was required, or performed in conjunction with maintenance required to maintain OPERABILITY or reliability.

SR 3.8.1.17

Demonstration of the test mode override ensures that the DG availability under accident conditions will not be compromised as the result of testing and the DG will automatically reset to ready to load operation if a LOCA actuation signal is received during operation in the test mode. Ready to load operation is defined as the DG running at rated speed and voltage with the DG output breaker open. These provisions for automatic switchover are required by IEEE-308 (Ref. 13), paragraph 6.2.6(2).

The requirement to automatically energize the emergency loads with offsite power is essentially identical to that of SR 3.8.1.12. The intent in the requirement associated with SR 3.8.1.17.b is to show that the emergency loading was not affected by the DG operation in test mode. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the emergency loads to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

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

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.17 (continued)

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include:

1) Unexpected operational events which cause the equipment to perform the function specified by this Surveillance, for which adequate documentation of the required performance is available; and

2) Post corrective maintenance testing that requires performance of this Surveillance in order to restore the component to OPERABLE, provided the maintenance was required, or performed in conjunction with maintenance required to maintain OPERABILITY or reliability.

SR 3.8.1.18

Under accident and loss of offsite power conditions loads are sequentially connected to the 6.9 kV shutdown board by the automatic load sequencer. The sequencing logic controls the permissive and starting signals to motor breakers to prevent overloading of the DGs due to high motor starting currents. The load sequence time specified in FSAR Table 8.3-3 ensures that sufficient time exists for the DG to restore frequency and voltage prior to applying the next load block and that safety analysis assumptions regarding ESF equipment time delays are not violated. The allowable values for the time delay relays are contained in system specific setpoint scaling documents. Reference 2 provides a summary of the automatic loading of ESF buses.

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

This SR is modified by a Note. The reason for the Note is that performing the Surveillance for DG 1A-A or 1B-B would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. This restriction from normally performing the Surveillance in MODE 1, 2, 3, or 4 is further amplified to allow the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g., post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed Surveillance, a successful Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a plant shutdown

(continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.1.18 (continued)

and startup to determine that plant safety is maintained or enhanced when the Surveillance is performed in MODE 1, 2, 3, or 4. Risk insights or deterministic methods may be used for this assessment. Credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include:

1) Unexpected operational events which cause the equipment to perform the function specified by this Surveillance, for which adequate documentation of the required performance is available; and

2) Post corrective maintenance testing that requires performance of this Surveillance in order to restore the component to OPERABLE, provided the maintenance was required, or performed in conjunction with maintenance required to maintain OPERABILITY or reliability.

SR 3.8.1.19

In the event of a DBA coincident with a loss of offsite power, the DGs are required to supply the necessary power to ESF systems so that the fuel, RCS, and containment design limits are not exceeded.

This Surveillance demonstrates the DG operation, as discussed in the Bases for SR 3.8.1.11, during a loss of offsite power actuation test signal in conjunction with an ESF actuation signal. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the DG system to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

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

For the purpose of this testing, the DGs shall be started from standby conditions, that is, with the engine coolant and oil being continuously circulated and temperature maintained consistent with manufacturer recommendations. The DG engines for WBN have an oil circulation and soakback system that operates continuously to preclude the need for a prelube and warmup when a DG is started from standby.

This SR is modified by a Note. The reason for the Note is that the performance of the Surveillance for DG 1A-A or 1B-B would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

(continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.1.19 (continued)

Examples of unplanned events may include:

1) Unexpected operational events which cause the equipment to perform the function specified by this Surveillance, for which adequate documentation of the required performance is available; and

2) Post corrective maintenance testing that requires performance of this Surveillance in order to restore the component to OPERABLE, provided the maintenance was required, or performed in conjunction with maintenance required to maintain OPERABILITY or reliability.

SR 3.8.1.20

This SR verifies that DG availability is not compromised by the idle start circuitry, when in the idle mode of operation, and that an automatic or emergency start signal will disable the idle start circuitry and command the engine to go to full speed. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.8.1.21

This Surveillance demonstrates that the DG starting independence has not been compromised. Also, this Surveillance demonstrates that each engine can achieve proper speed within the specified time when the DGs are started simultaneously. The minimum voltage and frequency stated in the SR are those necessary to ensure the DG can accept DBA loading while maintaining acceptable voltage and frequency levels. Stable operation at the nominal voltage and frequency values is also essential to establishing DG OPERABILITY, but a time constraint is not imposed. This is because a typical DG will experience a period of voltage and frequency oscillations prior to reaching steady state operation if these oscillations are not dampened out by load application. This period may extend beyond the 10 second acceptance criteria and could be a cause for failing the SR. In lieu of a time constraint in the SR, WBN will monitor and trend the actual time to reach steady state operation as a means of ensuring there is no voltage regulator or governor degradation which could cause a DG to become inoperable.

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

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.21 (continued)

For the purpose of this testing, the DGs shall be started from standby conditions, that is, with the engine coolant and oil being continuously circulated and temperature maintained consistent with manufacturer recommendations. The DG engines for WBN have an oil circulation and soakback system that operates continuously to preclude the need for a prelube and warmup when a DG is started from standby.

Diesel Generator Test Schedule

The DG test schedule (Table 3.8.1-1) implements the recommendations of Revision 3 to Regulatory Guide 1.9 (Ref. 3). The purpose of this test schedule is to provide timely test data to establish a confidence level associated with the goal to maintain DG reliability > 0.975 per demand.

According to Regulatory Guide 1.9, Revision 3 (Ref. 3), each DG should be tested at least once every 31 days. Whenever a DG has experienced 4 or more valid failures in the last 25 valid tests, the maximum time between tests is reduced to 7 days. Four failures in 25 valid tests is a failure rate of 0.16, or the threshold of acceptable DG performance, and hence may be an early indication of the degradation of DG reliability. When considered in the light of a long history of tests, however, 4 failures in the last 25 valid tests may only be a statistically probable distribution of random events. Increasing the test Frequency will allow for a more timely accumulation of additional test data upon which to base judgment of the reliability of the DG. The increased test Frequency must be maintained until seven consecutive, failure free tests have been performed.

The Frequency for accelerated testing is 7 days, but no less than 24 hours. Tests conducted at intervals of less than 24 hours may be credited for compliance with Required Actions. However, for the purpose of re-establishing the normal 31-day Frequency, a successful test at an interval of less than 24 hours should be considered an invalid test and not count towards the 7 consecutive failure free starts, and the consecutive test count is not reset.

A test interval in excess of 7 days (or 31 days as appropriate) constitutes a failure to meet the SRs and results in the associated DG being declared inoperable. It does not, however, constitute a valid test or failure of the DG, and any consecutive test count is not reset.

(continued)

BASES

REFERENCES

1. Title 10, Code of Federal Regulations, Part 50, Appendix A, General Design Criterion (GDC) 17, “Electrical Power Systems.”

2. Watts Bar FSAR, Section 8.2, “Offsite Power System,” and Tables 8.3-1 to 8.3-3, “Safety-Related Standby Power Sources and Distribution Boards,” “Shutdown Board Loads Automatically Tripped Following a Loss of Nuclear Unit and Preferred Power,” and “Diesel Generator Load Sequentially Applied Following a Loss of Nuclear Unit and Preferred Power.”

3. Regulatory Guide 1.9, Rev. 3, “Selection, Design, Qualification and Testing of Emergency Diesel Generator Units Used as Class 1E Onsite Electric Power Systems at Nuclear Power Plants,” July 1993.

4. Watts Bar FSAR Section 6, “Engineered Safety Features.”

5. Watts Bar FSAR, Section 15.4, “Condition IV-Limiting Faults.”

6. Regulatory Guide 1.93, Rev. 0, “Availability of Electric Power Sources,” December 1974.

7. Generic Letter 84-15, “Proposed Staff Actions to Improve and Maintain Diesel Generator Reliability,” July 2, 1984.

8. Title 10, Code of Federal Regulations, Part 50, Appendix A, GDC 18, “Inspection and Testing of Electric Power Systems.”

9. Regulatory Guide 1.137, Rev. 1, “Fuel Oil Systems for Standby Diesel Generators,” October 1979.

10. Watts Bar Drawing 1-47W605-242, “Electrical Tech Spec Compliance Tables.

11. Generic Letter 84-15, "Proposed Staff Actions to Improve and Maintain Diesel Generator Reliability," dated July 2, 1984.

12. Letter from Kimberly J. Green (NRC) to Mr. James Barstow (TVA) dated November 26, 2019, with Enclosures: (1) Amendment No. 129 to Facility Operating License No. NPF-90, (2) Amendment No. 32 to Facility Operating License No. NPF-96, and (3) NRC Safety Evaluation.

13. ANSI N195-1976, “Fuel Oil Systems for Standby Diesel Generators.”

(continued)

Enclosure

Attachment 4

Proposed TS Bases Change (Mark-Ups) for WBN Unit 2

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.9 (continued)

is equal to 60% of a typical 5 second load sequence interval associated with sequencing of the largest load. The voltage and frequency specified are consistent with the design range of the equipment powered by the DG. SR 3.8.1.9.a corresponds to the maximum frequency excursion, while SR 3.8.1.9.b and SR 3.8.1.9.c are steady state voltage and frequency values to which the system must recover following load rejection. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

This SR is modified by two Notes. The reason for Note 1 is that during operation with the reactor critical, performance of this SR could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, plant safety systems. Credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include:

1) Unexpected operational events which cause the equipment to perform the function specified by this Surveillance, for which adequate documentation of the required performance is available; and

2) Post-corrective maintenance testing that requires performance of this Surveillance in order to restore the component to OPERABLE, provided the maintenance was required, or performed in conjunction with maintenance required to maintain OPERABILITY or reliability.

Note 2 ensures that the DG is tested under load conditions that are as close to design basis conditions as possible. When synchronized with offsite power, testing should be performed at a power factor of ≤ 0.9. This power factor is representative of the actual inductive loading a DG would see under design basis accident conditions. Under certain conditions, however, Note 2 allows the Surveillance to be conducted at a power factor other than ≤ 0.9. These conditions occur when grid voltage is high, and the additional field excitation needed to get the power factor to ≤ 0.9 results in voltages on the emergency boards that are too high. Under these conditions, the power factor should be maintained as close as practicable to 0.9 while still maintaining acceptable voltage limits on the emergency boards. In other circumstances, the grid voltage may be such that the DG excitation levels needed to obtain a power factor of 0.9 may not cause unacceptable voltages on the emergency boards, but the excitation levels are in excess of those recommended for the DG. In such cases, the power factor shall be maintained as close as practicable to 0.9 without exceeding the DG excitation limits.
~~In order to ensure that the DG is tested under load conditions that are as close to design basis conditions as possible, Note 2 requires that, if~~

(continued)

~~synchronized to offsite power testing must be performed using a power factor ≥ 0.8 and ≤ 0.9. This power factor is chosen to be representative of the actual design basis inductive loading that the DG would experience.~~

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.10

This Surveillance demonstrates the DG capability to reject a full load without overspeed tripping or exceeding the predetermined voltage limits. The DG full load rejection may occur because of a system fault or inadvertent breaker tripping. This Surveillance ensures proper engine generator load response under the simulated test conditions. This test simulates the loss of the total connected load that the DG experiences following a full load rejection and verifies that the DG does not trip upon loss of the load. These acceptance criteria provide for DG damage protection. While the DG is not expected to experience this transient during an event and continues to be available, this response ensures that the DG is not degraded for future application, including reconnection to the bus if the trip initiator can be corrected or isolated. ~~In order to ensure that the DG is tested under load conditions that are as close to design basis conditions as possible, testing must be performed using a power factor ≥ 0.8 and ≤ 0.9. This power factor is chosen to be representative of the actual design basis inductive loading that the DG would experience.~~

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

This SR is modified by ~~a~~ two Notes. The reason for ~~the~~ Note 1 is that during operation with the reactor critical, performance of this SR could cause perturbation to the electrical distribution systems that could challenge continued steady state operation and, as a result, plant safety systems. Credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include:

1) Unexpected operational events which cause the equipment to perform the function specified by this Surveillance, for which adequate documentation of the required performance is available; and

2) Post-corrective maintenance testing that requires performance of this Surveillance in order to restore the component to OPERABLE, provided the maintenance was required, or performed in conjunction with maintenance required to maintain OPERABILITY or reliability.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.10 (continued)

Note 2 ensures that the DG is tested under load conditions that are as close to design basis conditions as possible. When synchronized with offsite power, testing should be performed at a power factor of ≤ 0.9. This power factor is representative of the actual inductive loading a DG would see under design basis accident conditions. Under certain conditions, however, Note 2 allows the Surveillance to be conducted at a power factor other than ≤ 0.9. These conditions occur when grid voltage is high, and the additional field excitation needed to get the power factor to ≤ 0.9 results in voltages on the emergency boards that are too high. Under these conditions, the power factor should be maintained as close as practicable to 0.9 while still maintaining acceptable voltage limits on the emergency boards. In other circumstances, the grid voltage may be such that the DG excitation levels needed to obtain a power factor of 0.9 may not cause unacceptable voltages on the emergency boards, but the excitation levels are in excess of those recommended for the DG. In such cases, the power factor shall be maintained as close as practicable to 0.9 without exceeding the DG excitation limits.

SR 3.8.1.11

As required by Regulatory Guide 1.9 (Ref. 3), paragraph C2.2.4, this Surveillance demonstrates the as-designed operation of the standby power sources during loss of the offsite source. This test verifies all actions encountered from the loss of offsite power, including shedding of the non-essential loads and energization of the emergency buses and respective loads from the DG. It further demonstrates the capability of the DG to automatically achieve the required voltage and frequency within the specified time.

The DG auto-start time of 10 seconds is derived from requirements of the accident analysis to respond to a design basis large break LOCA. The Surveillance should be continued for a minimum of 5 minutes in order to demonstrate that all starting transients have decayed and stability is achieved.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.11 (continued)

The requirement to verify the connection and power supply of permanent and auto-connected loads is intended to satisfactorily show the relationship of these loads to the DG loading logic. In certain circumstances, many of these loads cannot actually be connected or loaded without undue hardship or potential for undesired operation. For instance, Emergency Core Cooling Systems (ECCS) injection valves are not desired to be stroked open, or high pressure injection systems are not capable of being operated at full flow, or residual heat removal (RHR) systems performing a decay heat removal function are not desired to be realigned to the ECCS mode of operation. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the DG systems to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

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

For the purpose of this testing, the DGs shall be started from standby conditions, that is, with the engine coolant and oil being continuously circulated and temperature maintained consistent with manufacturer recommendations. The DG engines for WBN have an oil circulation and soakback system that operates continuously to preclude the need for a prelube and warmup when a DG is started from standby.

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include:

1) Unexpected operational events which cause the equipment to perform the function specified by this Surveillance, for which adequate documentation of the required performance is available; and

2) Post-corrective maintenance testing that requires performance of this Surveillance in order to restore the component to OPERABLE, provided the maintenance was required, or performed in conjunction with maintenance required to maintain OPERABILITY or reliability.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.12

This Surveillance demonstrates that the DG automatically starts and achieves the required voltage and frequency within the specified time (10 seconds) from the design basis actuation signal (LOCA signal) and operates for ≥ 5 minutes. The minimum voltage and frequency stated in the SR are those necessary to ensure the DG can accept DBA loading while maintaining acceptable voltage and frequency levels. Stable operation at the nominal voltage and frequency values is also essential to establishing DG OPERABILITY, but a time constraint is not imposed. This is because a typical DG will experience a period of voltage and frequency oscillations prior to reaching steady state operation if these oscillations are not dampened out by load application. This period may extend beyond the 10 seconds acceptance criteria and could be a cause for failing the SR. In lieu of a time constraint in the SR, WBN will monitor and trend the actual time to reach steady state operation as a means of ensuring there is no voltage regulator or governor degradation which could cause a DG to become inoperable. The 5 minute period provides sufficient time to demonstrate stability. SR 3.8.1.12.d and SR 3.8.1.12.e ensure that permanently connected loads and emergency loads are energized from the offsite electrical power system on an ESF signal without loss of offsite power.

The requirement to verify the connection of permanent and auto-connected loads is intended to satisfactorily show the relationship of these loads to the DG loading logic. In certain circumstances, many of these loads cannot actually be connected or loaded without undue hardship or potential for undesired operation. For instance, ECCS injection valves are not desired to be stroked open, or high pressure injection systems are not capable of being operated at full flow, or RHR systems performing a decay heat removal function are not desired to be realigned to the ECCS mode of operation. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the DG system to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

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

For the purpose of this testing, the DGs shall be started from standby conditions, that is, with the engine coolant and oil being continuously circulated and temperature maintained consistent with manufacturer recommendations. The DG engines for WBN have an oil circulation and soakback system that operates continuously to preclude the need for a prelube and warmup when a DG is started from standby.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.12 (continued)

This SR is modified by a Note. The reason for the Note is that during operation with the reactor critical, performance of this Surveillance could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, plant safety systems. Credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include:

1) Unexpected operational events which cause the equipment to perform the function specified by this Surveillance, for which adequate documentation of the required performance is available; and

2) Post-corrective maintenance testing that requires performance of this Surveillance in order to restore the component to OPERABLE, provided the maintenance was required, or performed in conjunction with maintenance required to maintain OPERABILITY or reliability.

SR 3.8.1.13

This Surveillance demonstrates that DG non-critical protective functions (e.g., high jacket water temperature) are bypassed on an automatic or emergency start signal and that critical protective functions (engine overspeed and generator differential current) remain functional to affect a DG trip to avert substantial damage to the DG unit or to the safety related equipment powered by the DG. It is not necessary to actually trip the DG using critical protective functions in order to satisfy this SR. The non-critical trips are bypassed during DBAs and provide an alarm on an abnormal engine condition. This alarm provides the operator with sufficient time to react appropriately. The DG availability to mitigate the DBA is more critical than protecting the engine against minor problems that are not immediately detrimental to emergency operation of the DG.

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

The SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required DG from service. Credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include:

1) Unexpected operational events which cause the equipment to perform the function specified by this Surveillance, for which adequate documentation of the required performance is available; and

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.13 (continued)

2) Post-corrective maintenance testing that requires performance of this Surveillance in order to restore the component to OPERABLE, provided the maintenance was required, or performed in conjunction with maintenance required to maintain OPERABILITY or reliability.

SR 3.8.1.14

Regulatory Guide 1.9 (Ref. 3), paragraph C2.2.9, requires demonstration that the DGs can start and run continuously for an interval of not less than 24 hours, ≥ 2 hours of which is at a load between 105% and 110% of the continuous duty rating and the remainder of the time at a load equivalent to 90% to 100% of the continuous duty rating of the DG. The DG starts for this Surveillance can be performed either from standby or hot conditions. The provisions for prelubricating and warmup, discussed in SR 3.8.1.2, and for gradual loading, discussed in SR 3.8.1.3, are applicable to this SR.

~~In order to ensure that the DG is tested under load conditions that are as close to design conditions as possible, testing must be performed using a power factor of ≥ 0.8 and ≤ 0.9. This power factor is chosen to be representative of the actual design basis inductive loading that the DG would experience. The load band is provided to avoid routine overloading of the DG. Routine overloading may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain DG OPERABILITY.~~

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

This Surveillance is modified by ~~three~~ four Notes. Note 1 states that momentary transients due to changing bus loads do not invalidate this test. Similarly, momentary power factor transients above the power factor limit will not invalidate the test. Note 2 establishes that this SR may be performed on only one DG at a time while in MODE 1, 2, 3, or 4. This is necessary to ensure the proper response to an operational transient (i.e., loss of offsite power, ESF actuation). Therefore, three DGs must be maintained operable and in a standby condition during performance of this test. In this configuration, the plant will remain within its design basis, since at all times safe shutdown can be achieved with two DGs in the same train.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.14 (continued)

Note 3 establishes that credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include:

1) Unexpected operational events which cause the equipment to perform the function specified by this Surveillance, for which adequate documentation of the required performance is available; and

2) Post-corrective maintenance testing that requires performance of this Surveillance in order to restore the component to OPERABLE, provided the maintenance was required, or performed in conjunction with maintenance required to maintain OPERABILITY or reliability.

Note 4 ensures that the DG is tested under load conditions that are as close to design basis conditions as possible. When synchronized with offsite power, testing should be performed at a power factor of ≤ 0.9. This power factor is representative of the actual inductive loading a DG would see under design basis accident conditions. Under certain conditions, however, Note 4 allows the Surveillance to be conducted at a power factor other than ≤ 0.9. These conditions occur when grid voltage is high, and the additional field excitation needed to get the power factor to ≤ 0.9 results in voltages on the emergency boards that are too high. Under these conditions, the power factor should be maintained as close as practicable to 0.9 while still maintaining acceptable voltage limits on the emergency boards. In other circumstances, the grid voltage may be such that the DG excitation levels needed to obtain a power factor of 0.9 may not cause unacceptable voltages on the emergency boards, but the excitation levels are in excess of those recommended for the DG. In such cases, the power factor shall be maintained close as practicable to 0.9 without exceeding the DG excitation limits.

Prior to performance of this SR in MODES 1 or 2, actions are taken to establish that adequate conditions exist for performance of the SR. The required actions are defined in Bases Table 3.8.1-2.

(continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.1.15

This Surveillance demonstrates that the diesel engine can restart from a hot condition, such as subsequent to shutdown from normal Surveillances, and achieve the required voltage and frequency within 10 seconds. The minimum voltage and frequency stated in the SR are those necessary to ensure the DG can accept DBA loading while maintaining acceptable voltage and frequency levels. Stable operation at the nominal voltage and frequency values is also essential to establishing DG OPERABILITY, but a time constraint is not imposed. This is because a typical DG will experience a period of voltage and frequency oscillations prior to reaching steady state operation if these oscillations are not dampened out by load application. This period may extend beyond the 10 seconds acceptance criteria and could be a cause for failing the SR. In lieu of a time constraint in the SR, WBN will monitor and trend the actual time to reach steady state operation as a means of ensuring there is no voltage regulator or governor degradation which could cause a DG to become inoperable. The 10 seconds time is derived from the requirements of the accident analysis to respond to a design basis large break LOCA. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

The DG engines for WBN have an oil circulation and soakback system that operates continuously to preclude the need for a prelube and warmup when a DG is started from standby.

This SR is modified by a Note to ensure that the test is performed with the diesel sufficiently hot. The load band is provided to avoid routine overloading of the DG. Routine overloads may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain DG OPERABILITY. The requirement that the diesel has operated for at least 2 hours at full load conditions prior to performance of this Surveillance is based on manufacturer recommendations for achieving hot conditions. Momentary transients due to changing bus loads do not invalidate this test.

SR 3.8.1.16

As required by Regulatory Guide 1.9 (Ref. 3), paragraph C2.2.11, this Surveillance ensures that the manual synchronization and automatic load transfer from the DG to the offsite source can be made and the DG can be returned to ready to load status when offsite power is restored. It also ensures that the auto-start logic is reset to allow the DG to reload if a subsequent loss of offsite power occurs. The DG is considered to be in ready to load status when the DG is at rated speed and voltage, the output breaker is open and can receive an autoclose signal on bus undervoltage, and the load sequence timers are reset.

(continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.1.16 (continued)

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

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include:

1) Unexpected operational events which cause the equipment to perform the function specified by this Surveillance, for which adequate documentation of the required performance is available; and

2) Post-corrective maintenance testing that requires performance of this Surveillance in order to restore the component to OPERABLE, provided the maintenance was required, or performed in conjunction with maintenance required to maintain OPERABILITY or reliability.

SR 3.8.1.17

Demonstration of the test mode override ensures that the DG availability under accident conditions will not be compromised as the result of testing and the DG will automatically reset to ready-to-load operation if a LOCA actuation signal is received during operation in the test mode. Ready-to-load operation is defined as the DG running at rated speed and voltage with the DG output breaker open. These provisions for automatic switchover are required by IEEE-308 (Ref. 10), paragraph 6.2.6(2).

The requirement to automatically energize the emergency loads with offsite power is essentially identical to that of SR 3.8.1.12. The intent in the requirement associated with SR 3.8.1.17.b. is to show that the emergency loading was not affected by the DG operation in test mode. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the emergency loads to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

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

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BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.17 (continued)

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include:

1) Unexpected operational events which cause the equipment to perform the function specified by this Surveillance, for which adequate documentation of the required performance is available; and

2) Post-corrective maintenance testing that requires performance of this Surveillance in order to restore the component to OPERABLE, provided the maintenance was required, or performed in conjunction with maintenance required to maintain OPERABILITY or reliability.

SR 3.8.1.18

Under accident and loss of offsite power conditions loads are sequentially connected to the 6.9 kV shutdown board by the automatic load sequencer. The sequencing logic controls the permissive and starting signals to motor breakers to prevent overloading of the DGs due to high motor starting currents. The load sequence time specified in FSAR Table 8.3-3 ensures that sufficient time exists for the DG to restore frequency and voltage prior to applying the next load block and that safety analysis assumptions regarding ESF equipment time delays are not violated. The allowable values for the time delay relays are contained in system specific setpoint scaling documents. Reference 2 provides a summary of the automatic loading of ESF buses.

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

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. This restriction from normally performing the Surveillance in MODE 1, 2, 3, or 4 is further amplified to allow the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g., post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed Surveillance, a successful Surveillance, and a perturbation of the offsite or onsite system

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.18 (continued)

when they are tied together or operated independently for the Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a plant shutdown and startup to determine that plant safety is maintained or enhanced when the Surveillance is performed in MODE 1, 2, 3, or 4. Risk insights or deterministic methods may be used for this assessment. Credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include:

1) Unexpected operational events which cause the equipment to perform the function specified by this Surveillance, for which adequate documentation of the required performance is available; and

2) Post-corrective maintenance testing that requires performance of this Surveillance in order to restore the component to OPERABLE, provided the maintenance was required, or performed in conjunction with maintenance required to maintain OPERABILITY or reliability.

SR 3.8.1.19

In the event of a DBA coincident with a loss of offsite power, the DGs are required to supply the necessary power to ESF systems so that the fuel, RCS, and containment design limits are not exceeded.

This Surveillance demonstrates the DG operation, as discussed in the Bases for SR 3.8.1.11, during a loss of offsite power actuation test signal in conjunction with an ESF actuation signal. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the DG system to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

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

For the purpose of this testing, the DGs shall be started from standby conditions, that is, with the engine coolant and oil being continuously circulated and temperature maintained consistent with manufacturer recommendations. The DG engines for WBN have an oil circulation and soakback system that operates continuously to preclude the need for a prelube and warmup when a DG is started from standby.

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BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.19 (continued)

This SR is modified by a Note. The reason for the Note is that the performance of the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include:

1) Unexpected operational events which cause the equipment to perform the function specified by this Surveillance, for which adequate documentation of the required performance is available; and

2) Post-corrective maintenance testing that requires performance of this Surveillance in order to restore the component to OPERABLE, provided the maintenance was required, or performed in conjunction with maintenance required to maintain OPERABILITY or reliability.

SR 3.8.1.20

This SR verifies that DG availability is not compromised by the idle start circuitry, when in the idle mode of operation, and that an automatic or emergency start signal will disable the idle start circuitry and command the engine to go to full speed.

SR 3.8.1.21

This Surveillance demonstrates that the DG starting independence has not been compromised. Also, this Surveillance demonstrates that each engine can achieve proper speed within the specified time when the DGs are started simultaneously. The minimum voltage and frequency stated in the SR are those necessary to ensure the DG can accept DBA loading while maintaining acceptable voltage and frequency levels. Stable operation at the nominal voltage and frequency values is also essential to establishing DG OPERABILITY, but a time constraint is not imposed. This is because a typical DG will experience a period of voltage and frequency oscillations prior to reaching steady state operation if these oscillations are not dampened out by load application. This period may extend beyond the 10 seconds acceptance criteria and could be a cause for failing the SR. In lieu of a time constraint in the SR, WBN will monitor and trend the actual time to reach steady state operation as a means of ensuring there is no voltage regulator or governor degradation which could cause a DG to become inoperable.

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

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BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.21 (continued)

For the purpose of this testing, the DGs shall be started from standby conditions, that is, with the engine coolant and oil being continuously circulated and temperature maintained consistent with manufacturer recommendations. The DG engines for WBN have an oil circulation and soakback system that operates continuously to preclude the need for a prelube and warmup when a DG is started from standby.

Diesel Generator Test Schedule

The DG test schedule (Table 3.8.1-1) implements the recommendations of Revision 3 to Regulatory Guide 1.9 (Ref. 3). The purpose of this test schedule is to provide timely test data to establish a confidence level associated with the goal to maintain DG reliability > 0.975 per demand.

According to Regulatory Guide 1.9, Revision 3 (Ref. 3), each DG should be tested at least once every 31 days. Whenever a DG has experienced 4 or more valid failures in the last 25 valid tests, the maximum time between tests is reduced to 7 days. Four failures in 25 valid tests is a failure rate of 0.16, or the threshold of acceptable DG performance, and hence may be an early indication of the degradation of DG reliability. When considered in the light of a long history of tests; however, 4 failures in the last 25 valid tests may only be a statistically probable distribution of random events. Increasing the test Frequency will allow for a more timely accumulation of additional test data upon which to base judgment of the reliability of the DG. The increased test Frequency must be maintained until seven consecutive, failure free tests have been performed.

The Frequency for accelerated testing is 7 days, but no less than 24 hours. Tests conducted at intervals of less than 24 hours may be credited for compliance with Required Actions. However, for the purpose of re-establishing the normal 31 day Frequency, a successful test at an interval of less than 24 hours should be considered an invalid test and not count towards the 7 consecutive failure free starts, and the consecutive test count is not reset.

A test interval in excess of 7 days (or 31 days as appropriate) constitutes a failure to meet the SRs and results in the associated DG being declared inoperable. It does not, however, constitute a valid test or failure of the DG, and any consecutive test count is not reset.

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BASES

REFERENCES

1. Title 10, Code of Federal Regulations, Part 50, Appendix A, General Design Criterion (GDC) 17, “Electrical Power Systems.”

2. Watts Bar FSAR, Section 8.2, “Offsite Power System,” and Tables 8.3-1 to 8.3-3, “Safety-Related Standby (Onsite) Power Sources and Distribution Boards,” “Shutdown Board Loads Automatically Tripped Following a Loss of Nuclear Unit and Preferred (Offsite) Power,” and “Diesel Generator Load Sequentially Applied Following a Loss of Nuclear Unit and Preferred (Offsite) Power.”

3. Regulatory Guide 1.9, Rev. 3, “Selection, Design, Qualification and Testing of Emergency Diesel Generator Units Used as Class 1E Onsite Electric Power Systems at Nuclear Power Plants,” July 1993.

4. Watts Bar FSAR Section 6, “Engineered Safety Features.”

5. Watts Bar FSAR, Section 15.4, “Condition IV-Limiting Faults.”

6. Regulatory Guide 1.93, Rev. 0, “Availability of Electric Power Sources,” December 1974.

7. Generic Letter 84-15, “Proposed Staff Actions to Improve and Maintain Diesel Generator Reliability,” July 2, 1984.

8. Title 10, Code of Federal Regulations, Part 50, Appendix A, GDC 18, “Inspection and Testing of Electric Power Systems.”

9. Regulatory Guide 1.137, Rev. 1, “Fuel Oil Systems for Standby Diesel Generators,” October 1979.

10. IEEE-308-1971, “IEEE Standard Criteria for Class 1E Power Systems for Nuclear Power Generating Stations,” Institute of Electrical and Electronic Engineers.

11. Letter from Kimberly J. Green (NRC) to Mr. James Barstow (TVA) dated November 26, 2019, with Enclosures: (1) Amendment No. 129 to Facility Operating License No. NPF-90, (2) Amendment No. 32 to Facility Operating License No. NPF-96, and (3) NRC Safety Evaluation.

12. ANSI N195-1976, “Fuel Oil Systems for Standby Diesel Generators.”

13. Watts Bar Drawing 2-47W605-242, “Electrical Tech Spec Compliance Tables.”