Duke Energy®
Carolinas

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May 28, 2009

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

Subject: Duke Energy Carolinas, LLC
Catawba Nuclear Station, Units 1, and 2
Docket Nos. 50-413, 50-414
License Amendment Request (LAR), Technical Specification 3.8.1, "AC Sources-Operating" to revise Emergency Diesel Generator Voltage Limits

In accordance with the provisions of Section 50.90 of Title 10 of the Code of Federal Regulations, Duke Energy Carolinas, LLC is submitting a request for amendment to the Technical Specifications (TS) for Catawba Nuclear Station, Units 1 and 2. The proposed license amendment request will revise the TS 3.8.1 AC Sources-Operating. This LAR restricts the voltage limits for the applicable TS 3.8.1 surveillances governing the Emergency Diesel Generators. The voltage range will be revised to minus five and plus ten percent. The revision to the voltage limits are becoming more restrictive to assure compliance with plant design bases and the way the plant is operated, thus assuring the Diesel Generators are capable of supplying power with correct voltage to the required electrical loads.

Currently, the voltage limits are being administratively controlled under the provisions of NRC Administrative Letter 98-10, as the current TS voltage limits were determined to be non-conservative.

The voltage limit change is the result of an industry concern where the limits established in Regulatory Guide (RG) 1.9, Revision 2, "Selection, Design, and Qualification of Diesel-Generator Units Used as Standby (Onsite) Electric Power Systems at Nuclear Power Plants," were determined to not have any plant specific calculation basis for all conditions and events. The

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RG guidance was the basis for limits in the Catawba Unit 1 and 2 TS.

Included within the cover letter is an affidavit. Enclosure 1 provides a description and assessment of the proposed changes. Additional contents of the proposal package include the following:

Attachment 1: Proposed Technical Specification Changes (Mark-Up)
Attachment 2: Technical Specification Bases Changes (Mark-Up)

Duke Energy requests approval of the proposed license amendment within one calendar year of the LAR submittal date. Duke Energy is requesting a 60-day implementation grace period due to the extensive document changes necessary to implement this license amendment.

Implementation of this proposed amendment will impact the Catawba Updated Final Safety Analysis Report (UFSAR).

This LAR has been reviewed and approved by the Catawba Nuclear Station Plant Operations Review Committee and Duke Energy Nuclear Safety Review Board.

In accordance with 10 CFR 50.91; a copy of this application with enclosures and attachments is being provided to the designated South Carolina state official.

There are no new regulatory commitments contained in this LAR. Inquiries on this matter should be directed to Adrienne F. Driver at 803.701.3445.

Very Truly Yours,

James R. Morris
Site Vice President, Catawba Nuclear Station

Enclosures:
1. Basis for Proposed Changes

Attachments:
1. Proposed Technical Specification Changes (Mark-up)
2. Technical Specification Bases Changes (Mark-up)

AFFIRMATION OF OATH

Mr. James R. Morris affirms that he is the Site Vice President at the Catawba Nuclear Station of Duke Energy Carolinas, LLC, is authorized to execute this oath on behalf of Duke Energy Carolinas, LLC and is the person who subscribed his name to the foregoing statement that all the matters and facts set forth herein are true and correct to the best of his knowledge.

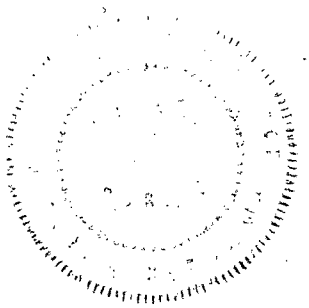
James R. Morris

Subscribed and sworn to me: 5-28-2009
Date

Notary Public

My Commission Expires: 7-10-2012
Date

SEAL



xc w/Enclosures and Attachments:

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RGC Date File
Document Control File 801.01

Basis for Proposed Changes

1.0 DESCRIPTION OF PROPOSED CHANGES

This evaluation supports a request to amend Operating Licenses NPF-35 and NPF-52 for Catawba Nuclear Station (CNS) Units 1 and 2, respectively. The proposed changes would revise Technical Specification 3.8.1, "AC Sources-Operating" to change the voltage band to minus five and plus ten percent (≥ 3950 V and ≤ 4580 V).

The proposed revision would change all occurrences of the Emergency Diesel Generator (EDG) voltage minimum band requirement for the Technical Specification Surveillances Requirements (TSSR). The specific Technical Specification changes for CNS Unit 1 and Unit 2 are shown below:

3.8.1 AC Sources-Operating

TSSR 3.8.1.2 "Verify each DG starts from standby conditions and achieves steady state voltage ≥ 3950 V and ≤ 4580 V, and frequency ≥ 58.8 Hz and ≤ 61.2 Hz."

- TSSR: 3.8.1.7
- TSSR: 3.8.1.9
- TSSR: 3.8.1.11
- TSSR: 3.8.1.12
- TSSR: 3.8.1.15
- TSSR: 3.8.1.19
- TSSR: 3.8.1.20

1.1 BACKGROUND

During the conversion to Improved Technical Specification (ITS) most plants incorporated the Regulatory Guide (RG) 1.9 values of voltage and frequency limits. Compliance with RG 1.9, Rev. 2 for CNS includes the design of the Diesel Generators used as standby power supplies. The Catawba Nuclear Station Unit 1 and Unit 2 periodic Surveillance Requirements for demonstrating the operability of the Diesel Generators are in accordance with the recommendations of RG 1.108 "Periodic Testing of Diesel Generator Units used as Onsite Electric Power Systems at Nuclear Power Plants," Revision 1, Sections C.2.a.1 through, C.2.b, C.2.c, C.2.e, and C.3. This Regulatory Guidance document was withdrawn by the Nuclear Regulatory Commission on August 5, 1993 in Federal Registrar 58FR 41813.

Basis for Proposed Changes

The Nuclear Regulatory Commission raised concern during the Component Design Basis Inspection at several plants with regards to the Emergency Core Cooling System (ECCS) pump performance under degraded Emergency Diesel Generator frequency conditions. Testing is normally performed at the nominal voltage and frequency of 4160 VAC and 60 Hz; although analysis had not been performed to demonstrate the capability and performance at the frequency high and low limits.

Impacts of voltages and frequencies when too high or too low include the following:

- Voltage too low would cause the EDG loads to not operate correctly. Additionally, this could cause increased motor current which may cause some motor loads to trip on over current.

- A high voltage increases resistive loading in kilowatt (kW), including cable losses, which reduces available margin

- A high frequency increases induction motor load in kW, and could also reduce EDG margin.

- Frequency too low would negatively impact pump motor speed affecting pump flow and motor operated valve stroke times.

CNS has determined that the values in the CNS Technical Specifications are non-conservative. The existing voltage limits are based on 4160 V Class-1E bus limits. The minimum and maximum limits of 3950 V and 4580 V are based on minus 5% and plus 10% of the Class-1E bus voltage rating of 4160V.

Frequency limits based on EDG capability were evaluated after industry operating experience indicated that the existing steady state frequency limits may not be adequate for all conditions and events (i.e. the EDG may not be able to support the electrical loads or parameters; flow rates and valve stroke times may not meet requirements) if EDG is allowed to operate at extremes of the allowed frequency range. The current CNS TS frequency range is plus or minus 2% (58.8 Hz to 61.2 Hz).

Results of the engineering evaluation performed in 2007 indicate the new CNS ITS limits will be acceptable with respect to load

performance. The engineering evaluation demonstrated that a decrease in EDG frequency of 2% would not prevent the safety-related pumps from performing their design functions. Sufficient differential pressure and flow would be developed to assure the accident analyses minimums would be provided. Additionally, no safety-related motor operated valves would exceed their maximum allowed stroke time if the EDG frequency was reduced by 2% which would cause the valve to open slower. The evaluation also demonstrated that with a 2% increase in frequency, the impact on available kW would not prevent the EDG or the required Engineered Safeguards components from performing their design function.

Conclusively, it was determined a 2% increase in EDG frequency coupled with a 5% EDG voltage decrease, all safety related MOVs are operable. Administrative limits have been established for the minimum and maximum voltage limits (plus or minus) on EDG start testing to ensure operability of the supported equipment.

Plant specific calculations have been performed that demonstrate the EDG operability based on administrative voltage limits that are found in current plant surveillance procedures. Calculations use ranges of 98-102% frequency (58.8-61.2 Hz) and 90-110% voltage. These voltage and frequency calculations support the proposed TS voltage limits, Engineering Design Basis Documents and updated FSAR concerning EDG transient voltage and frequency limits during block loading and EDG kW loading limits. Transient voltage and frequency limits are based on RG 1.9.

2.0 TECHNICAL EVALUATION

2.1 System Description

Catawba Nuclear Station Power Sources consists of the offsite power sources and the onsite 4160VAC standby power source. Each train of the 4160VAC Essential Auxiliary Power System is provided with a separate and independent Emergency Diesel Generator to supply the Class 1E loads required to safely shutdown the unit following a Design Basis Accident.

Each Diesel Generator automatically starts upon the loss of voltage to its associated 4160 volt essential bus or a Safety Injection Actuation Signal. Either of the above signals actuates the load sequencer associated with each Diesel Generator. In addition to the above automatic start initiation signals, each Diesel Generator can also be manually started for test and

maintenance purposes from the control room or from the local diesel control panel.

The CNS Emergency Diesel Generators are designed to meet the requirements of Regulatory Guide 1.9, Revision 2 dated December 1979 titled Selection, Design and Qualification of Diesel-Generator Units Used as Standby (Onsite) Electric Power Systems at Nuclear Power Plants.

2.2 Justification

Due to the manner in which loads are sequenced onto the bus, specific EDG voltage and frequency limits have been established for transient and steady state operation to assure the EDG will be able to perform its function and the loads will be able to perform their functions. Catawba Diesel Generators shall be capable of accepting the loads assigned by the sequencer while maintaining bus voltage and frequency levels above the limits called for in RG 1.9, Revision 2.

NRC Administrative Letter 98-10, "Dispositioning of Technical Specifications That Are Insufficient to Assure Plant Safety," states that the discovery of an inadequate TS value is considered a degraded condition under Generic Letter 91-18. Administrative controls are an acceptable short term corrective action, along with a license amendment request submittal, to resolve the condition in a timely manner. Administrative controls have been established at Catawba Nuclear Station for Unit 1 and Unit 2 voltage limits. This LAR requests that these more restrictive values be incorporated into the CNS Unit 1 and Unit 2 Technical Specifications.

An engineering evaluation of EDG loading was performed. Considering the TS allowable value for the emergency bus degraded voltage conditions, it has been determined that the current EDG voltage requirements in TS 3.8.1 are non-conservative. This condition has been dispositioned in accordance with NRC Administrative Letter 98-10. Administrative controls were completed and implemented on March 26, 2007 to ensure that minimum acceptance criteria for future EDG testing would include the minimum required voltage of 3950 volts.

The calculated voltage and frequency dips resulting from a motor starting during initial sequencer loading and manual loading events are less than 25% and 5%, respectively. Following each load

Basis for Proposed Changes

application, the generator voltage and frequency are calculated to recover no less than 90% (3744 V) within 40% of the sequence time interval and no less than 98% (58.8 Hz) within 50% of the sequence time interval, respectively.

The initial dip limits of 25% voltage and 5% for frequency during the start of each load sequence interval were taken from RG 1.9 December 1979,Revision 2,. The recovery limits of 10% for voltage and 2% for frequency, within 60% of the time between each load sequence time interval, were also taken from RG 1.9, Revision 2.

EDG operability has been validated at the tighter voltage band of $\geq$ 3950V and $\leq$ 4580V. A historical review of the EDG surveillance test results for voltage was performed. It was concluded that the administrative voltage limits have been satisfied for each test.

The EDG loading calculation was also reviewed to ensure adequate margin exists between the various EDG ratings and worst case loading profiles. The limiting loading condition or LOOP analysis is not affected.

UFSAR Section 8.3.1.1.2 states the following for Black Out: "Loads required within the first 12 minutes following a Black Out are automatically sequenced on the diesel generator. Those loads required after 12 minutes are manually loaded as necessary." Abnormal Operating procedural guidance ensures that the TS load limit of 5750 KW is not exceeded during the manual addition of loads following a Black Out event.

The effects of EDG operations at plus and minus 2% EDG frequency variation on Motor Operated Valves were also evaluated. The following components did not meet standard conservative criteria, but were found acceptable with current administrative controls.

- 1RN225B "Containment Spray Heat Exchange Inlet Isolation Valve"
- 2VI77B "Containment Isolation Valve"

Information Provided as Precedents from Previous Submittals

In the event of a simultaneous LOOP and fire, to shutdown both units from outside the Control Room, Catawba Abnormal Procedures (AP) are followed. This procedure requires that prior to evacuating the Control Room, the Operator transfer control over to the Auxiliary Shutdown Panel. Sufficient instrumentation and controls are provided outside the control room to bring the plant to a Hot Standby Condition. Appropriate guidance is included within APs to ensure that the EDGs are operating within loading limits.

2.2 Conclusion of Technical Evaluation

The EDGs provide assured power within specific voltage and frequency ranges to safety related equipment in order for the equipment to perform the appropriate safety related function. The present voltage is based on guidance provided in RG 1.9, Revision 2, and incorporated into the CNS Improved Technical Specifications. Calculations to demonstrate design margin were later performed that utilize a 2% tolerance for EDG frequency.

Raising the lower EDG voltage limit will correct a non-conservative TS value for CNS Unit 1 and Unit 2. Administrative controls have been implemented to ensure that the EDGs testing procedures use the more restrictive voltage limits. The administrative controls will assure that the EDG's are operated within the more restrictive limits in order to maintain the initial conditions for the accident analyses until this LAR is implemented.

3.0 REGULATORY ANALYSIS

3.1 Applicable Regulatory Requirements

10 CFR 50, Appendix A, "General Design Criteria for Nuclear Power Plants, Criterion 17, "Electric Power Systems," states that an onsite electric power system and an offsite electric power system shall be provided to permit function of structures systems and components important to safety. The safety function for each system (assuming the other system is not functioning) shall be to provided sufficient capacity and capability to assure that: (1)

specified acceptable fuel design limits and design conditions of the reactor coolant pressure boundary are not exceeded as a result of anticipated operational occurrences, and (2) the core is cooled and containment integrity and other vital functions are maintained in the event of a postulated accidents.

10 CFR 50, Appendix A, "General Design Criteria for Nuclear Power Plants, Criterion 18, "Inspection and Testing of Electric Power Systems," states that electrical power systems important to safety shall be designated to permit appropriate periodic inspection and testing of important areas and features…

10 CFR 50.36, Technical Specifications," paragraph (c)(3), "Surveillance Requirements," specifies that surveillance requirements are requirements relating to test, calibration, or inspection to assure the necessary quality of systems and components is maintained, that facility operations will be within safety limits, and that the limiting conditions for operation will be met.

In review of the GDCs the proposed amendment to the voltage band does not impact the conformance to the above applicable design criteria.

3.2 Significant Hazards Consideration

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

No. The increase in the minimum EDG output voltage acceptance value in TS 3.8.1 Surveillance Requirements does not adversely affect any of the parameters in the accident analyses. The proposed change increases the minimum allowed EDG output voltage to ensure that sufficient voltage is available to operate the required Emergency Safety Feature (ESF) equipment under accident conditions. Additionally the increase in minimum voltage output voltage allowed ensures that adequate voltage is available to support the assumptions made in the Design Bases Accident (DBA) analyses. This conservative change of the EDG voltage output acceptance criteria does not affect the probability of evaluated accidents, but rather provides increased assurance that the EDGs will provide a sufficient voltage. Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

Basis for Proposed Changes

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

No. The increase in the minimum EDG output voltage acceptance criterion supports the assumptions in the accident analyses that sufficient voltage will be available to operate ESF equipment on the Class 1E buses when these buses are powered from the Emergency Diesel Generators. The maximum EDG output voltage of 4580 volts is not affected by this change. The change in minimum output voltage from 3740 to 3950 volts ensures the reliability of the onsite emergency power source. Therefore, the proposed change will not create the possibility of a new or different kind of accident from any previously evaluated.

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

This proposed license amendment is limited to increasing the minimum EDG output voltage acceptance criterion in TS 3.8.1 Surveillance Requirements. No other surveillance criterion is affected. The surveillance frequencies and test requirement are unchanged. This amendment provides increased assurance that the EDG will provide sufficient voltage to its respective components to ensure design requirements are satisfied. Therefore, the proposed change will not involve a significant reduction in a margin of safety.

3.3 Conclusion of Regulatory Analysis

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

Basis for Proposed Changes

4.0 Precedents

As further support for this requested amendment, Duke Energy notes that relevant precedents exists granting an amendment to revise the minimum voltage band for the EDGs.

Reactor	NRC Approval Date	Accession No.
DTE Energy, Fermi 2	April 17, 20008	ML070860204
American Electric Power, Donald C. Cook Nuclear Plant Units 1 and 2	April 30, 2009	ML090630245

5.0 NRC Commitments

There are no new regulatory commitments contained in this LAR.

6.0 ENVIRONMENTAL CONSIDERATION

The proposed amendments do not involve (i) a significant consideration, (ii) a significant change in the types or a 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 meet 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.

Basis for Proposed Changes

7.0 REFERENCES

1. U.S. Nuclear Regulatory Commission 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," December 1979, Revision 2.

2. U.S. Nuclear Regulatory Commission Administrative Letter 98-10, "Dispositioning of Technical Specifications that are Insufficient to Assure Plant Safety," December 29, 1998.

3. Title 10 - Code of Federal Regulations, "Energy," Part 50, Domestic Licensing of Production and Utilization Facilities," Appendix A, "General Design Criteria for Nuclear Power Plants," Criterion 18, "Inspection and Testing of Electrical Power Systems"

4. Catawba Nuclear Station Updated Final Safety Analysis, Chapter 8, "Electric Power", November 15, 2007

5. U.S. Nuclear Regulatory Commission Regulatory Guide 1.108, "Periodic Testing of Diesel Generator Units Used As Onsite Electric Power Systems at Nuclear Power Plants", Revision 1

ATTACHMENT 1

TECHNICAL SPECIFICATION PAGES (MARK-UP)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.1.1	Verify correct breaker alignment and indicated power availability for each offsite circuit.	7 days
SR 3.8.1.2	----------NOTES---------- 1. Performance of SR 3.8.1.7 satisfies this SR. 2. All DG starts may be preceded by an engine prelube period and followed by a warmup period prior to loading. 3. A modified DG start involving idling and gradual acceleration to synchronous speed may be used for this SR as recommended by the manufacturer. When modified start procedures are not used, the time, voltage, and frequency tolerances of SR 3.8.1.7 must be met. ---------- Verify each DG starts from standby conditions and achieves steady state voltage $\geq$ ~~3740~~ 3950 V and $\leq$ 4580 V, and frequency $\geq$ 58.8 Hz and $\leq$ 61.2 Hz.	31 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.7	----------NOTE---------- All DG starts may be preceded by an engine prelube period. ---------- Verify each DG starts from standby condition and achieves in ≤ 11 seconds voltage of ≥ ~~3740~~ 3950 V and frequency of ≥ 57 Hz and maintains steady-state voltage ≥ ~~3740~~ 3950 V and ≤ 4580 V, and frequency ≥ 58.8 Hz and ≤ 61.2 Hz.	184 days
SR 3.8.1.8	Verify automatic and manual transfer of AC power sources from the normal offsite circuit to each alternate offsite circuit.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.9	----------NOTE---------- If performed with the DG synchronized with offsite power, it shall be performed at a power factor $\leq$ 0.9. ---------- 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 $\leq$ 63 Hz; b. Within 3 seconds following load rejection, the voltage is $\geq$ ~~3740~~ 3950 V and $\leq$ 4580 V; and c. Within 3 seconds following load rejection, the frequency is $\geq$ 58.8 Hz and $\leq$ 61.2 Hz.	18 months
SR 3.8.1.10	Verify each DG does not trip and generator speed is maintained $\leq$ 500 rpm during and following a load rejection of $\geq$ 5600 kW and $\leq$ 5750 kW.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
SR 3.8.1.11 ----------NOTES---------- 1. All DG starts may be preceded by an engine prelube period. 2. This Surveillance shall not be performed in MODE 1, 2, 3, or 4. ---------- Verify on an actual or simulated loss of offsite power signal: a. De-energization of emergency buses; b. Load shedding from emergency buses; c. DG auto-starts from standby condition and: 1. energizes the emergency bus in $\leq$ 11 seconds, 2. energizes auto-connected shutdown loads through automatic load sequencer, 3. maintains steady state voltage $\geq$ ~~3740~~ 3950 V and $\leq$ 4580 V, 4. maintains steady state frequency $\geq$ 58.8 Hz and $\leq$ 61.2 Hz, and 5. supplies auto-connected shutdown loads for $\geq$ 5 minutes.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.12	----------NOTE---------- All DG starts may be preceded by prelube period. ----------	
	Verify on an actual or simulated Engineered Safety Feature (ESF) actuation signal each DG auto-starts from standby condition and:	18 months
	a. In ≤ 11 seconds after auto-start and during tests, achieves voltage ≥ ~~3740~~ 3950 V and ≤ 4580 V;	
	b. In ≤ 11 seconds after auto-start and during tests, achieves frequency ≥ 58.8 Hz and ≤ 61.2 Hz;	
	c. Operates for ≥ 5 minutes; and	
	d. The emergency bus remains energized from the offsite power system.	

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
SR 3.8.1.15 ----------NOTES---------- 1. This Surveillance shall be performed within 5 minutes of shutting down the DG after the DG has operated ≥ 1 hour loaded ≥ 5600 kW and ≤ 5750 kW or until operating temperature is stabilized. Momentary transients outside of load range do not invalidate this test. 2. All DG starts may be preceded by an engine prelube period. ---------- Verify each DG starts and achieves, in ≤ 11 seconds, voltage ≥ ~~3740~~ 3950 V, and frequency ≥ 57 Hz and maintains steady state voltage ≥ ~~3740~~ 3950 V and ≤ 4580 V and frequency ≥ 58.8 Hz and ≤ 61.2 Hz.	18 months
SR 3.8.1.16 ----------NOTE---------- This Surveillance shall not be performed in MODE 1, 2, 3, or 4. ---------- 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 standby operation.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
SR 3.8.1.19 ----------NOTES---------- 1. All DG starts may be preceded by an engine prelube period. 2. This Surveillance shall not be performed in MODE 1, 2, 3, or 4. ---------- 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 the emergency bus in ≤ 11 seconds, 2. energizes auto-connected emergency loads through load sequencer, 3. achieves steady state voltage ≥ ~~3740~~ 3950 V and ≤ 4580 V, 4. achieves steady state frequency ≥ 58.8 Hz and ≤ 61.2 Hz, and 5. supplies auto-connected emergency loads for ≥ 5 minutes.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.20	----------NOTE---------- All DG starts may be preceded by an engine prelube period. --- Verify when started simultaneously from standby condition, each DG achieves, in ≤ 11 seconds, voltage of ≥ ~~3740~~ 3950 V and frequency of ≥ 57 Hz and maintains steady state voltage ≥ ~~3740~~ 3950 V and ≤ 4580 V, and frequency ≥ 58.8 Hz and ≤ 61.2 Hz.	10 years