

Public Service
Electric and Gas
Company

Louis F. Storz

Public Service Electric and Gas Company P.O. Box 236, Hancocks Bridge, NJ 08038

609-339-5700

Senior Vice President - Nuclear Operations

SEP 25 1996

LR-N96228
LCR S95-36

United States Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

**REQUEST FOR CHANGE TO TECHNICAL SPECIFICATIONS
EMERGENCY DIESEL GENERATOR TESTING
SALEM GENERATING STATION UNIT NOS. 1 AND 2
FACILITY OPERATING LICENSES DPR-70 AND DPR-75
DOCKET NOS. 50-272 AND 50-311**

Gentlemen:

In accordance with 10CFR50.90, Public Service Electric & Gas (PSE&G) Company hereby requests a revision to the Technical Specifications (TS) for the Salem Generating Station Unit Nos. 1 and 2. In accordance with 10CFR50.91(b)(1), a copy of this submittal has been sent to the State of New Jersey.

The proposed TS changes to Specification 3/4.8.1, "Electrical Power Systems," revise the Emergency Diesel Generator (EDG) voltage and frequency limits as a result of updated EDG load calculations and eliminate ambiguity in the testing methodology for EDG start timing. The timed start testing requirements are consistent with pending changes to Revision 1 of the improved "Standard Technical Specifications Westinghouse Plants," NUREG-1431 and similar to Hope Creek TS Amendment 92 approved by the Staff on February 6, 1996.

The proposed changes have been evaluated in accordance with 10CFR50.91(a)(1), using the criteria in 10CFR50.92(c), and PSE&G has concluded that this request involves no significant hazards consideration.

The basis for the requested change is provided in Attachment 1. A 10CFR50.92 evaluation with a determination of no significant hazards consideration is provided in Attachment 2. The marked up Technical Specification pages affected by the proposed changes are provided in Attachment 3.

9610030109 960925
PDR ADOCK 05000272
P PDR

Adock
1/1

SEP 25 1996

Document Control Desk
LR-N96228

-2-

Upon NRC approval of this proposed change, PSE&G requests that the amendment be made effective on the date of issuance, but allow an implementation period of sixty days to provide sufficient time for associated administrative activities.

Should you have any questions regarding this request, we will be pleased to discuss them with you.

Sincerely,



Affidavit
Attachments (3)

C Mr. H. J. Miller, Administrator - Region I
U. S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Mr. L. Olshan, Licensing Project Manager - Salem
U. S. Nuclear Regulatory Commission
One White Flint North
11555 Rockville Pike
Mail Stop 14E21
Rockville, MD 20852

Mr. C. Marschall (X24)
USNRC Senior Resident Inspector - Salem

Mr. K. Tosch, Manager IV
Bureau of Nuclear Engineering
33 Arctic Parkway
CN 415
Trenton, NJ 08625

ems

**SALEM GENERATING STATION UNIT NOS. 1 AND 2
FACILITY OPERATING LICENSES DPR-70 AND DPR-75
DOCKET NOS. 50-272 AND 50-311
CHANGE TO TECHNICAL SPECIFICATIONS
EMERGENCY DIESEL GENERATOR TESTING**

BASIS FOR REQUESTED CHANGE

This submittal addresses three issues related to emergency diesel generator (EDG) surveillance testing. The first two, related to the steady state voltage and frequency bands, were identified during a review of calculations performed in conjunction with the Electrical Distribution System Functional Inspection (EDSFI). The third issue was identified during a detailed review of EDG testing methodology. Current Technical Specifications (TS) imply that the timed surveillance starts require stabilizing within the voltage and frequency band in the designated time frame specified in the TS. However, this implied requirement extends the timing criteria beyond the design basis and introduces an increased probability that the EDGs would experience unwarranted test failures and require increased EDG starts and/or adjustments to the governor controls. A similar start timing issue was resolved at Hope Creek with TS Amendment 92.

In order to simplify the explanations of the proposed changes, the start timing issue will be addressed separately from the change in voltage and frequency since it has a different technical basis.

A. VOLTAGE AND FREQUENCY

REQUESTED CHANGE AND PURPOSE

The steady state EDG frequency specified in the Surveillance Requirements (SRs) that test the EDG during simulated Loss of Offsite Power (LOOP) conditions (e.g., while the governor is in the isochronous mode) is changed from 60 ± 1.2 Hz to the range 58.8 to 60.5 Hz.

The steady state EDG voltages specified in the SRs that test the EDG while disconnected from the grid and parallel to the grid are changed from 3950-4580 volts to 3910-4400 volts and 3910-4580 volts, respectively.

The proposed changes will ensure that the EDGs are not run in an overloaded condition (from excessive frequency) and that the driven equipment is protected from potential over-voltage conditions during postulated accident conditions. This is

further described in the justification section of this attachment.

BACKGROUND

Salem's EDSFI resulted in revisions to the EDG steady state loading calculation. These revisions addressed potential EDG overloading due to excessive frequency conditions during post-accident operation with auto-connected loads sequenced on the bus. The conclusion reached in this calculation was that the EDG may exceed the ratings specified by the manufacturer if the EDG is operated at greater than 60.5 Hz in the steady state condition under certain accident conditions (e.g., LOOP with a Loss of Coolant Accident). Additional calculations were generated to address voltage limits. These calculations concluded that driven equipment can experience damage if the bus voltage is operated at greater than 4400 volts in the steady state condition.

There are two modes of operation for the EDG governor controls: isochronous mode maintains frequency when the EDG, alone, is powering the bus (i.e., the bus is not paralleled to the grid) and droop mode which, by providing additional flexibility in the frequency control band, allows the EDG to be paralleled to the grid. The governor controls are maintained in the isochronous mode when in standby, but shifted to the droop mode immediately prior to testing sequences that result in, ultimately, paralleling the EDG to the grid. The governor controls are left in the isochronous mode for testing sequences that result in the EDG powering the bus with the bus separated from the grid.

In the droop mode, proper governor control response is demonstrated by maintaining the EDG frequency within a band of 60 ± 1.2 Hz, as currently specified in the TS. However, in order to ensure that SRs demonstrate the ability of the EDG governor controls to maintain the required frequency following a LOOP (when isochronous mode is used), a narrower band of control, 58.8 to 60.5 Hz must be specified for those SRs that test in the isochronous mode.

The EDGs are tested in three different electrical configurations: 1) EDG output breaker open, 2) EDG output breaker closed with the associated 4 kV bus paralleled to the grid, and 3) EDG output breaker closed with the associated 4 kV bus separated from the grid. During testing with the EDG output breaker closed and the associated 4 kV bus paralleled to the grid, the EDG output voltage must match grid voltage requirements. In these instances, proper voltage regulator control is demonstrated if the generator output voltage is maintained between 3910 and 4580 volts.

During testing with the EDG paralleled to the grid, the generator terminal voltage may be above the driven loads' steady state limit of 4400 volts in order for the reactive load (VARs) to be maintained within limits. However, normal system operating procedures ensure that bus voltages are maintained to support acceptable motor terminal voltages. The EDG and 4 kV buses are rated at 4580 volts and are not affected by the higher generator terminal voltage.

During testing with the EDG output breaker open or with the output breaker closed and the 4 kV bus separated from the grid proper voltage regulator control is demonstrated when the EDG output voltage is maintained between 3910 and 4400 volts. This ensures that the voltage will be maintained within the requirements of driven equipment during accident conditions.

JUSTIFICATION OF REQUESTED CHANGES

The current Surveillance Requirement 4.8.1.1.2.d specifies an EDG frequency band of 60 ± 1.2 Hz in all places. It is appropriate to demonstrate that the EDG will maintain this frequency band during testing with the EDG in the droop mode. The droop mode has a wider control band and may not be able to satisfy the narrower frequency band. During surveillance testing in the droop mode with the EDG paralleled to the grid, EDG loading is manually applied. Surveillance procedures ensure that the manual EDG loading does not exceed EDG limits. Therefore, the existing values for frequency are not being changed in those SRs that test the EDG with the governor in the droop mode.

The isochronous mode, (i.e., when the bus is isolated from the offsite source), is provided for post-accident scenarios with auto-connected loads being sequenced on the bus. The isochronous mode has a narrower control band than the droop mode. During testing in the isochronous mode the steady state frequency must be below 60.5 Hz in order to demonstrate that the governor control will preclude overloading the EDG during post-accident conditions.

TSs 4.8.1.1.2.d.2, 4.8.1.1.2.d.3.b, 4.8.1.1.2.d.4 and 4.8.1.1.2.d.6.b are satisfied by running the EDGs in the isochronous mode. These SRs should, therefore, specify the narrower band for frequency to demonstrate that the governor will preclude controlling the EDG in an overloaded condition. For the remaining SRs, the EDGs are tested in the droop mode.

It is appropriate to maintain the voltage band at 3910-4580 volts when paralleled to the grid, since the driven equipment is protected by controlling bus voltage independent of the diesel

generator voltage regulator. The narrower band of 3910-4400 volts should be applied when the generator is separated from the grid since this demonstrates that the voltage regulator will protect driven equipment during accident conditions when manual bus voltage control is not assumed.

All SRs in TS 4.8.1.1.2.d start the EDG with the generator separated from the grid. For these, the narrower voltage band is appropriate to ensure that the voltage regulator control band will function to preclude exposing driven equipment to damaging voltage conditions during post-accident conditions. However, for those SRs that subsequently parallel to the grid the wider band is applied to the paralleled configuration. The wider band for voltage in the paralleled condition is necessary for the generator to match grid voltage conditions while remaining within generator reactive (VAR) loading limitations. During testing with the EDG at the higher voltage, normal system operating procedures ensure that bus voltages are maintained to support acceptable motor terminal voltages. The EDG and the 4 kV buses are rated at 4580 volts and are not affected by the higher generator terminal voltage during this testing.

All voltage and frequency values specified in SR 4.8.1.1.2 are representative of the analytical values and do not account for postulated instrument inaccuracy. Instrument inaccuracies for testing EDG voltage and frequency will be administratively controlled.

The proposed changes to the bases are consistent with the TS LCO and define terms used in the TS to support implementation of the TS by explaining the intent of the changes.

CONCLUSIONS

Providing a narrower band for voltage and frequency in appropriate SRs is necessary due to re-analysis of EDG loading and provides protection for both the EDG and driven equipment during post-accident conditions. Since it is during steady state operation in the isochronous mode that post-accident conditions are simulated, the narrower limits for frequency should be applied for SRs that require testing under these conditions. Similarly, the narrower band for voltage should be applied whenever testing with the EDG not paralleled to the grid.

B. START TIMING

REQUESTED CHANGE AND PURPOSE

The voltage and frequency bands of ≥ 3950 and ≤ 4580 volts and 60 ± 1.2 Hz currently specified in TS for the unloaded start time testing are being eliminated and replaced with minimum values of ≥ 3910 volts and ≥ 58.8 Hz. The ten second start requirement to attain an engine speed of 900 rpm is also being eliminated. The elimination of the voltage and frequency bands will permit consistent, trendable timing results and will eliminate unnecessary adjustments to the governor between the 18 month loaded tests. The 18 month loaded surveillance tests, representative of the emergency configuration, will continue to ensure that start timing, voltage and frequency meet the design basis.

Since it is desirable to ensure that the governor and voltage regulator adequately control the EDG, a requirement is added to ensure stabilization within specified voltage and frequency bands after the engine has satisfied the initial timing requirement.

The six month start is modified to start from a standby configuration, rather than an ambient configuration in order to clarify that this start can be preceded with prewarming and prelube. In addition the term "shall" in footnote * is being replaced with "may" to allow the use of manufacturers' recommendations for loading, warmup and prelube, rather than requiring loading and prelube for each start. These changes are consistent with proposed changes in the improved "Standard Technical Specifications Westinghouse Plants," NUREG 1431 (ITS) and are similar to the TS changes approved for Hope Creek in Amendment 92 on February 6, 1996.

The phrase, "After energization of these loads" is added to TS 4.8.1.1.2.d.3.b and 4.8.1.1.2.d.6.b to qualify when steady state is achieved. Additional qualification of the term "steady state" is added to the TS bases.

BACKGROUND

Until July 1995, EDG start timing criterion was met if the time from engine start initiation until the lower end of the specified voltage and frequency band was reached within thirteen seconds. As a result of a reassessment of procedure adequacy by the Salem plant staff, the monthly surveillance test procedures were revised to require the voltage and frequency to be stabilized in the stated band within thirteen seconds.

The proposed change ensures the testing methodology aligns with the licensing basis and proposed changes to the ITS in order to prevent unwarranted EDG test failures and/or governor control adjustments in the unloaded configuration.

During PSE&G's development of Hope Creek Amendment 92, the NRC Staff indicated there were other generic issues that should be addressed. These included the elimination of the requirement for "dry starts" for the six month tests by substitution of the term "standby condition" for "ambient" and deleting the connotation that all diesel starts had to be followed by loading by substituting "may" for "shall" in footnote *. Similar changes are proposed in this request for Salem.

In addition, new TS bases are being added which will describe the revised start timing requirements, describe the thirteen-second requirement origination, provide a mechanism for identifying degradation of governor or voltage controls during unloaded starts, and define the terms "standby condition" and "preventive maintenance" used in the TS.

JUSTIFICATION OF REQUESTED CHANGES

The purpose of the SRs that perform an unloaded, timed start is to demonstrate that the EDG has the capability to accept load within 13 seconds from receipt of the start signal. This supports the accident analysis assumption that automatic bus loading will occur within 17 seconds from the start of the event. The timed start test is accomplished by initiating a start signal and timing to the achievement of a speed and voltage that satisfy the EDG output breaker closure interlocks. The EDG output breaker closure interlock settings for speed and voltage are 57 Hz and 3863* volts, respectively. At these values, coincident with an undervoltage condition on the respective 4160 volt vital bus, the EDG output breaker would close and the EDG would assume loading. The values of ≥ 58.8 Hz and ≥ 3910 volts selected as timing criteria for this license change provides conservatism to the these output breaker interlock setpoints.

The requirement to subsequently achieve stabilization within the voltage and frequency bands ensures continued monitoring of the governor and voltage regulator controls.

* NOTE: The voltage interlock setpoint for all EDGs in both units is to be raised to 3863 volts, from an existing value of 1050 volts, prior to startup from the current outage(s).

The timing to rated engine speed, 900 rpm, within ten seconds is being eliminated. This requirement reflected the original EDG design to start and accelerate to rated speed within 10 seconds and met the intent of Regulatory Guide (RG) 1.108, "Periodic Testing of Diesel Generator Units Used as Onsite Electrical Power Systems at Nuclear Power Plants", to ensure adequate starting capability and EDG reliability. The surveillance was retained in adopting the recommendations of Generic Letter (GL) 94-15, "Proposed Staff Actions to Improve and Maintain Diesel Generator Reliability", (refer to Amendments 148/126), since failure to meet this criteria could have been indicative of a problem with the starting capability (e.g., controls, starting air system). However, in accordance with this proposed TS change, degradations that might impact EDG starting capability will similarly be identified by trending frequency during the EDG surveillance. Since engine speed and generator frequency are directly proportional, it is necessary to monitor only one of these parameters, in addition to voltage, to ensure a successful EDG start. Timing of frequency is proposed since the thirteen seconds is within the time credited in the accident analyses and the timing of 900 rpm within ten seconds is not associated with any specific design parameter, (such as generator field flashing). The intent of RG 1.108 and GL 94-15 is still maintained.

For the once-per-ten-year start, in SR 4.8.1.1.2.e, the timed speed requirement is satisfied with a frequency of 58.8 Hz in less than or equal to 13 seconds. This is consistent with the other timed-start specifications. Elimination of the 900 rpm in 10 second requirement is also consistent with ITS, Rev 1 that does not require recording the amount of time to achieve rated engine speed.

The term "standby" replaces "ambient" in describing the EDG pre-start condition. The term "ambient" implies that the diesel engine is at the same temperature as the surrounding air temperature prior to starting. In fact, the Salem EDGs are maintained in a prewarmed and prelubed (i.e., "standby") condition to minimize the wear on the engine during starting. In the Safety Evaluation Report (SER) to Hope Creek Amendment 92, the NRC Staff concurred that the use of EDG prewarming is important in minimizing engine wear due to starting.

In footnote *, the term "shall" is replaced with "may." The intent of this footnote is to allow loading and prelube in accordance with the manufacturers' recommendations, not to require loading and prelube each time the engine is started. In the SER for Hope Creek Amendment 92 the NRC Staff concurred with this change by stating that alternatives to manufacturers' recommendations for EDG loading, where such loading is required

by TS, may be determined by the licensee, as reflected by replacing the term "must" with the term "may."

The proposed changes to the bases are consistent with the TS, define terms used in the TS and support implementation of the TS by explaining the intent of the changes.

CONCLUSIONS

The intent of the SRs which start-time the EDGs in an unloaded configuration is to demonstrate that the EDGs can attain rated frequency and voltage, and thus be capable of accepting load within thirteen seconds. This supports assumptions in the accident analysis. The proposed changes are consistent with this intent.

**SALEM GENERATING STATION UNIT NOS. 1 AND 2
FACILITY OPERATING LICENSES DPR-70 AND DPR-75
DOCKET NOS. 50-272 AND 50-311
CHANGE TO TECHNICAL SPECIFICATIONS
EMERGENCY DIESEL GENERATOR TESTING**

10CFR50.92 EVALUATION

Public Service Electric & Gas (PSE&G) has concluded that the proposed changes to the Salem Generating Station Unit Nos. 1 and 2 Technical Specifications (TS) do not involve a significant hazards consideration. In support of this determination, an evaluation of each of the three standards set forth in 10CFR50.92 is provided below for both changes.

A. VOLTAGE AND FREQUENCY

REQUESTED CHANGE

The steady state Emergency Diesel Generator (EDG) voltage specified in the TS Surveillance Requirements (SRs) that test the generator separated from the grid is changed from 3950-4580 volts to 3910-4400 volts and to 3910-4580 volts when connected to the grid. The steady state EDG frequency specified in the SRs that require running in the isochronous mode is changed from 60 ± 1.2 Hz to 58.8 to 60.5 Hz.

BASIS

1. *The proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.*

Since no change is being made to the offsite power supplies, or to any system or component that interfaces with the offsite power supplies, there is no change in the probability of a Loss of Offsite Power Accident.

The proposed changes provide the necessary conservatism for voltage and frequency to ensure the EDGs are not run in an overloaded condition and that driven equipment is not damaged during steady state operation following a Loss of Offsite Power coincident with a Loss of Coolant Accident. Since the narrower band of voltage and frequency for the isochronous mode continues to ensure proper steady state operation of the

EDG and associated driven equipment, there is no change in the consequences of an accident previously evaluated.

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

2. *The proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.*

The proposed amendment does not result in any design or physical configuration changes to the EDGs. Proposed changes made to the testing parameters and testing methodology will not cause a new or different accident since the EDGs are used for accident mitigation and no new failure modes are being introduced. Therefore, the proposed amendment will not create the possibility of a new or different kind of accident from any previously evaluated.

3. *The proposed change does not involve a significant reduction in a margin of safety.*

The proposed amendment provides further conservatism to the voltage and frequency band currently specified in the TSs. The proposed voltage and frequency changes ensure the EDG will not be overloaded from an over-frequency condition and driven equipment will not be damaged from an over-voltage condition.

The control system is set to control the EDG voltage within the bands specified in the requested changes. The changes are consistent with current calculations and within the capability of the controls. Since the narrower band of voltage and frequency for the isochronous mode is bounded by the existing TS, there is no change in the margin of safety. The increased band for droop mode will ensure the EDG is capable of operating in accordance with normal offsite power parameters and does not reduce the margin of safety.

CONCLUSION

Based on the above, PSE&G has determined that the proposed changes do not involve a significant hazards consideration.

B. START TIMING

REQUESTED CHANGE

The voltage and frequency bands currently specified in TS for the unloaded start time testing are to be eliminated and replaced with minimum values. Also being eliminated is the ten second start time to attain an engine speed of 900 rpm. A requirement is being added to achieve stabilization within the voltage and frequency bands subsequent to the timed start.

The term "ambient" is changed to "standby" to allow prewarming and prelube to precede all starts for testing purposes. Footnote * is modified to allow loading, warmup and prelube to be done in accordance with vendor recommendations, not to require them.

BASIS

1. *The proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.*

Since no change is being made to the offsite power supplies, or to any system or component that interfaces with the offsite power supplies, there is no change in the probability of a Loss of Offsite Power Accident.

The proposed change still ensures that the surveillance requirements meet the licensing basis and that the full spectrum of loading, unloading and standby testing performed at the 18 month frequency continues to demonstrate the capability of the EDGs to satisfy onsite power requirements during simulated accident conditions while the monthly testing demonstrates availability. Therefore, there is no change in the consequences of an accident.

This change ensures the surveillance requirements reflect the design basis and provide a basis for consistent timing methodology. The EDGs will continue to function as stated in the UFSAR. The revised surveillance testing criteria will ensure satisfactory engine performance and can identify potential degradation. The capability for the EDGs to accept load within thirteen seconds is retained in the testing requirements which is consistent with the current accident analysis assumptions. Therefore, elimination of the ten second start time criteria does not significantly increase the consequences of an accident.

Since the proposed change is consistent with the intent of the existing specifications, with proposed changes in the improved "Standard Technical Specifications Westinghouse Plants," NUREG 1431 (ITS), with Hope Creek Amendment 92 and with the design basis of the system and since no physical changes are being proposed, no action will occur that will increase the probability or consequences of an accident.

2. *The proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.*

The proposed change does not result in any design or physical configuration changes to the offsite power supplies or to the EDGs. Operation in accordance with the proposed change will not impair the EDGs' ability to perform as provided in the design basis. By eliminating unnecessary adjustments to the EDG governor control, performance during any accident is potentially enhanced. The EDGs will continue to function as stated in the UFSAR. Therefore, the proposed change will not create the possibility of a new or different kind of accident from any previously evaluated.

3. *The proposed change does not involve a significant reduction in a margin of safety.*

Timing of frequency does not reduce the margin of safety since the thirteen seconds is within the credited time assumed in the accident analyses and the timing of 900 rpm within ten seconds is not associated with any specific design parameter. Since the proposed change does not involve the addition or modification of plant equipment, is consistent with the intent of the existing TSS, with proposed changes in the ITS, with Hope Creek Amendment 92, with the design basis of the EDGs and with the UFSAR and meets the intent of applicable Regulatory Guides, no action will occur that will involve a significant reduction in a margin of safety.

CONCLUSION

Based on the above, PSE&G has determined that the proposed changes do not involve a significant hazards consideration.

**SALEM GENERATING STATION UNIT NOS. 1 AND 2
FACILITY OPERATING LICENSES DPR-70 AND DPR-75
DOCKET NOS. 50-272 AND 50-311
CHANGE TO TECHNICAL SPECIFICATIONS
EMERGENCY DIESEL GENERATOR TESTING**

TECHNICAL SPECIFICATION PAGES WITH PROPOSED CHANGES

The following Technical Specifications for Facility Operating License No. DPR-70 are affected by this change request:

<u>Technical Specification</u>	<u>Page</u>
4.8.1.1.2.a.2	3/4 8-3
4.8.1.1.2.c	3/4 8-3
4.8.1.1.2.d.2	3/4 8-4
4.8.1.1.2.d.3.b	3/4 8-4
4.8.1.1.2.d.4	3/4 8-4
4.8.1.1.2.d.6.b	3/4 8-4
4.8.1.1.2.d.7	3/4 8-5
4.8.1.1.2.e	3/4 8-5
4.8.1.1.2.f	3/4 8-5
footnote "*"	3/4 8-5a
Bases 3/4.8.1	B 3/4 8-1

The following Technical Specifications for Facility Operating License No. DPR-75 are affected by this change request:

<u>Technical Specification</u>	<u>Page</u>
4.8.1.1.2.a.2	3/4 8-3
4.8.1.1.2.c	3/4 8-3
4.8.1.1.2.d.2	3/4 8-4
4.8.1.1.2.d.3.b	3/4 8-4
4.8.1.1.2.d.4	3/4 8-4
4.8.1.1.2.d.6.b	3/4 8-4
4.8.1.1.2.d.7	3/4 8-5
4.8.1.1.2.e	3/4 8-5
4.8.1.1.2.f	3/4 8-5
footnote "*"	3/4 8-6
Bases 3/4.8.1	B 3/4 8-1

INSERTS

Insert A

the diesel generator starts from standby conditions* and achieves ≥ 3910 volts and ≥ 58.8 Hz in ≤ 13 seconds, and subsequently achieves steady state voltage of ≥ 3910 and ≤ 4400 volts and frequency of 60 ± 1.2 Hz.

Insert B

The diesel generator shall achieve ≥ 3910 volts and ≥ 58.8 Hz in ≤ 13 seconds, and subsequently achieves steady state voltage of ≥ 3910 and ≤ 4400 volts and frequency of ≥ 58.8 and ≤ 60.5 Hz.

Insert C

The minimum voltage and frequency stated in the Surveillance Requirements (SR) are those necessary to ensure the Emergency Diesel Generator (EDG) can accept Design Basis Accident (DBA) loading while maintaining acceptable voltage and frequency levels. Stable operation at the nominal voltage and frequency values is also essential in establishing EDG OPERABILITY, but a time constraint is not imposed. The lack of a time constraint is based on the fact that a typical EDG 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. In lieu of a time constraint in the SR, controls will be provided to monitor and trend the actual time to reach stable operation within the band as a means of ensuring there is no voltage regulator or governor degradation that could cause an EDG to become inoperable.

"Standby condition" for the purpose of defining the condition of the engine immediately prior to starting for surveillance requirements requires that the jacket water and lube oil are within the temperature bands controlled by the automatic heaters. The minimum lube oil temperature for an OPERABLE diesel is 100 degrees F.

The thirteen second time requirement for the Emergency Diesel Generator to reach rated voltage and frequency was originally based on a Westinghouse assumption of fifteen seconds that included the delay time between the occurrence of the incident and the application of electrical power to the first sequenced safeguards pump (BURL-3011, dated November 13, 1974) and included an instrument response time of two seconds (BURL-1531, dated July 27, 1970). The times specified in UFSAR Section 15.4 bound the thirteen seconds specified in the TS.

INSERT C (continued)

The narrower band for frequency specified for testing performed in steady state isochronous operation will ensure the EDG will not be run in an overloaded condition (steady state) during accident conditions. Steady state is assumed to be achieved after one minute of operation in the isochronous mode with all required loads sequenced on the bus.

The narrower band for steady state voltage is specified for operation when the EDG is not synchronized to the grid to ensure the voltage regulator will protect driven equipment from over-voltages during accident conditions. Procedural controls will ensure that equipment voltages are maintained within acceptable limits during testing when paralleled to the grid.

The wider band for frequency is appropriate for testing done with the governor in the droop mode. Likewise the wider band for voltage is appropriate when paralleled to the grid.

All voltages and frequencies specified in SR 4.8.1.1.2 are representative of the analytical values and do not account for postulated instrument inaccuracy. Instrument inaccuracies for EDG voltage and frequency are administratively controlled.

Preventive maintenance includes those activities (including pre-test inspections, measurements, adjustments and preparations) performed to maintain an otherwise operable EDG in an operable status. Corrective maintenance includes those activities required to correct a condition that would cause the EDG to be inoperable.