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September 24, 2002
RC-02-0147

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

Attention: Ms. K. R. Cotton

Ladies and Gentlemen:

Subject: VIRGIL C. SUMMER NUCLEAR STATION
DOCKET NO. 50/395
TECHNICAL SPECIFICATION AMENDMENT REQUEST TSP 01-0235
REVISION TO EMERGENCY DIESEL GENERATOR START TIME
SURVEILLANCE REQUIREMENT

South Carolina Electric & Gas Company (SCE&G), acting for itself and as agent for South Carolina Public Service Authority, hereby requests an amendment to the Virgil C. Summer Nuclear Station (VCSNS) Technical Specifications (TS). This request is being submitted pursuant to 10 CFR 50.90.

This proposed change would revise Technical Specification (TS) 4.8.1.1, "AC Sources" and the associated Bases section related to the Emergency Diesel Generators (EDG). This change would clarify the requirement for the start time test performed on a 184 day and an 18 month frequency. The current requirement is to have the EDGs within the voltage and frequency limits within 10 seconds after the start signal. The proposed change is to have the EDG above the minimum voltage and frequency within 10 seconds and verified to be within the voltage and frequency limits as a steady state condition.

This change to page 3/4 8-4 and 3/4 8-5 is being requested as the result of past difficulties with the EDG governors during unloaded surveillance testing, where during setup, the relationship between stability and meeting the 10 second acceptance criteria is a concern. With the unit set such that the time limit can be easily satisfied, the voltage and frequency values tend to overshoot. A much more stable setup challenges the 10 second voltage and frequency requirement.

A change is also proposed to TS 3.8.1.1 Action b.2 that will closely resemble Condition 3.8.1.b.3 in NUREG 1431, Revision 2. This change was included in NUREG 1431, Revision 0. This change will permit 24 hours for VCSNS to determine if a component failure is a common cause and should preclude unnecessary challenges to the EDG for failures that are obviously not common cause. This guidance is also provided in NUREG 1366 to limit the degradation caused by excessive testing.

A001

Additionally, a proposed change is included which will revise Section 4.8.1.1.2 to state the fuel oil surveillance program will be based on the applicable American Society for Testing and Materials (ASTM) standards. Currently the TS requirements state the surveillance program is in accordance with the applicable ASTM standard. This change will resolve concerns over verbatim compliance with the standards. This change is similar to one approved for South Texas Project, Units 1 and 2, Amendments 68 and 57, TAC No. M88291 and M88292.

Additionally several administrative changes are being made to page 3/4 8-3 to correct mistakes introduced in Amendments 93 and 121.

VCSNS requests that this proposed amendment be approved by June 30, 2003 with a 60 day implementation. This will provide sufficient time for procedure revisions and training to the affected organizations. The requested by date will permit SCE&G to maximize the benefit of reduced EDG wear and stress as soon as possible during the current operating cycle.

The VCSNS Plant Safety Review Committee and the Nuclear Safety Review Committee have reviewed this amendment application.

The TS amendment request is contained in the following attachments:

Enclosure

The V. C. Summer evaluation of the proposed change

Attachments

Attachment I Explanation of Changes Summary and Affected Pages

Attachment II Regulatory Commitments

There are no other TS changes in process that will affect or be affected by this change request.

Various FSAR Sections (8.3, 7.3 and 9.5) were reviewed. There is no impact to these sections as a result of this proposed change. The FPER was reviewed but was not affected.

There are no commitments being made in this amendment request.

A copy of this application and associated attachments is being provided to the designated South Carolina State official in accordance with 10 CFR 50.91.

Should you have questions, please call Mr. Philip A. Rose at (803) 345-4052.

I certify under penalty of perjury that the foregoing is true and correct.

9/24/02
Executed On


Stephen A. Byrne

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PAR/SAB/dr
Attachments (2)

c: N. O. Lorick
N. S. Carns
T. G. Eppink (w/o Attachment)
R. J. White
L. A. Reyes
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RTS (0-C-01-0235)
File (813.20)
DMS (RC-02-0147)

EVALUATION
FOR REVISING AN EDG SURVEILLANCE REQUIREMENT IN
THE VIRGIL C. SUMMER NUCLEAR STATION
TECHNICAL SPECIFICATIONS

1.0 Description of Amendment Request

The proposed license amendment request (LAR) will revise Surveillance Requirement 4.8.1.1.2.f.1 and 4.8.1.1.2.g.5 to more accurately reflect the plant conditions during Emergency Diesel Generator (EDG) start testing. Since the Emergency Diesel Generators are started and not connected to any load during this test, there is a tendency for the voltage and frequency to overshoot their limits prior to settling down to the steady state values. This condition does not occur when the EDGs are connected to loads.

The proposed license amendment will change the surveillance requirement (SR) to state that the EDG must reach a minimum voltage and frequency value within the 10 second acceptance criteria, and the steady state voltage and frequency must be verified within the established maximum and minimum values. The associated Bases section will also be revised to address this change. The changes are consistent with NRC approved Industry/Technical Specification Task Force (TSTF) Standard Technical Specification Change Traveler, TSTF-163, Revision 2.

A change is also proposed to Action b.2 to permit a determination of no common cause for component failures within 24 hours of a failure or start the redundant EDG per Surveillance Requirement 4.8.1.1.2.a.3 to assure operability. The wording will be the same as in Condition 3.8.1.B.3.1 and B.3.2 of NUREG 1431, Revision 2, and will prevent unnecessary challenges to the EDGs. A revision to the footnote on page 3/4.8-1 will provide assurance that the required actions are completed once the Limiting Condition for Operability is entered.

Additionally this LAR proposes to revise the wording in SR 4.8.1.1.2 to state that the sampling and testing program for the EDG fuel oil would be per the guidance in the applicable American Society of Testing and Materials (ASTM) standards instead of verbatim compliance with the standard. This will permit additional flexibility in improving the surveillance program to assure the fuel oil meets or exceeds the requirements for EDG fuel oil.

Several administrative changes are being made to correct mistakes introduced during the processing of the submittals for amendments 93 and 121. The first is a substitution of the word "at" for the word "of" in 4.8.1.1.2.d.1.b, which occurred during retyping of the page. The second is the removal of the word "not", which was incorrectly inserted in the submittal. The removal of this word allows the sentence to read as intended, permitting a range of acceptance values for the surveillance test.

2.0 Proposed Change

Specifically the proposed change would revise the following:

2.1 TS 3.8.1.1, ACTION b.2

The ACTION requirement would be revised to determine that the affected EDG is not inoperable due to a common cause failure within 24 hours, otherwise perform Surveillance Requirement 4.8.1.1.2.a.3 for the unaffected EDG. The footnote at the bottom of the page will be revised to state the testing has to be completed regardless of when the inoperable EDG is restored.

2.2 TS 4.8.1.1.2.f.1

The Surveillance Requirement would be revised such that the time requirement is separated from the requirement that assures the EDG voltage and frequency are within the limits that satisfy both the design and licensing basis of the plant. There will now be a 4.1.1.2.f.1.a and a 4.1.1.2.f.1.b in the SR that assures the operability of the EDGs.

2.3 TS 4.8.1.1.2.d and 4.8.1.1.2.e

The Surveillance Requirement would be revised to permit surveillance "based on the applicable ASTM standard" as opposed to the current wording of "in accordance with the applicable ASTM standard". Additionally, 4.1.1.2.d.1.d is being revised to remove the words "with proper color" since the addition of some dyes to the fuel oil will prevent this requirement from being completed successfully.

2.4 TS 4.8.1.1.2.g.5

The Surveillance Requirement would be revised such that the time requirement is separated from the requirement that assures the EDG voltage and frequency are within the limits that satisfy both the design and licensing basis of the plant.

3.0 Background

In the past, repetitive problems have been encountered in setting EDG governors to satisfy both the Surveillance Requirements (SR) for a ten second start test and be stable to support other surveillance testing. The current ten second start test requires that the EDG accelerate from rest and achieve steady state frequency and voltage conditions within a ten second time limit. The EDG operates unloaded during this test. After engine start for this test, the governor does not begin controlling speed/frequency until the EDG reaches the governor control setpoint of 60 hertz (rated speed). When the governor assumes control of the engine speed, it must overcome the momentum of the engine and adjust the speed back to the setpoint. This results

in the frequency and voltage always overshooting the allowable limit. In order to restore the frequency and voltage within limits and still be within the ten second time limit, the governor must be adjusted to be extremely responsive. During governor setup, the response adjustment is made by increasing the gain while reducing the stability. Since the EDG must be adjusted to be so responsive, it is virtually on the edge of being unstable. For this reason past problems have been encountered where the EDG was able to satisfy the ten second start time requirement, but then experienced load swings during loaded runs or frequency oscillations following unloading. Other times following governor setup, stable operation occurred during and after loaded runs, but the ten second start time limit could not be attained.

The concern with this method of testing is that it does not adequately simulate the start and operation of the EDG during an emergency condition. During an emergency start, the EDG would accelerate from rest and when it reaches the breaker closure permissive, the breaker would close. This would result in the EDG immediately accepting some load from the bus, which would have a stabilizing effect on the EDG. The governor would assume speed control at 60 hertz, but due to the loading would not have to overcome the full momentum of the EDG. Thus, extreme responsiveness of the governor would not be required. Setup of the governor to more closely simulate an emergency start condition would allow a more stable condition.

Separation of the SR for the ten second start into two requirements would more closely represent emergency operation. The first requirement would show that an EDG is capable of accelerating to the breaker closure permissive and achieving minimum voltage within ten seconds. The second requirement would verify proper governor and voltage regulator operation by establishing that an EDG could maintain proper frequency and voltage control. Other SRs verify the capability of the EDG to assume the required load within the acceptance criteria. This issue has been identified by the industry and a revision to the Improved Standard Technical Specifications (ITS) was developed (TSTF-163). This change was approved and incorporated into Revision 2 of the ITS NUREGS.

Over the years, there have been issues with single component failures on the EDGs. These failures were for the most part determined to not be failures that could also occur on the redundant EDG during the same time period; i.e. not common cause failures. However, the wording in our current TS did not give any latitude in performing a surveillance test to assure continued operability of the unaffected diesel. Each test start of a diesel engine causes additional wear and it is possible to degrade an EDG just from excessive testing. This concern was recognized during the initial development of NUREG 1431, which now permits the extent of condition to be determined to see if a test start is required. If the determination cannot be completed within 24 hours, or it appears the failure is common cause, the testing requirement would have to be satisfied to assure operability. The normal TS surveillance testing schedule assures that operable EDG(S) are capable of performing their intended safety functions. A failure of one EDG does not reduce the reliability of another, otherwise operable EDG. Deleting this requirement does not affect the design or performance characteristics of the EDG, once a common mode failure has been dismissed. Therefore, the EDGs maintain their ability to perform their design function.

It has long been a concern that verbatim compliance with the ASTM standards for EDG fuel oil may cause acceptable fuel oil to fail the acceptance criteria. This concern is based on several issues, most notably the use of dye in high sulfur fuel oil and the fact that several of the standards are not specific to EDG fuel oil. With the option of revising the fuel oil surveillance program such that applicable portions of the standards can be used, or to allow alternative but equivalent testing methods, a more efficient and effective program can be established. A similar change to this surveillance requirement was granted to South Texas Project, Units 1 and 2, Amendments 68 and 57, TAC Numbers M88291 and M88292 respectively.

4.0 TECHNICAL ANALYSIS

SAFETY EVALUATION

TS 4.8.1.1.2.f.1 and 4.8.1.1.2.g.5

The design function of the EDGs is to provide AC power to required safety systems within a specific time period during any Loss of Offsite Power (LOOP) event. The limiting design basis accident assumed is the Loss of Coolant Accident (LOCA) concurrent with a LOOP. During these LOOP events the EDG starts and its output breaker closes on the de-energized bus to supply power. The EDG, once loaded, will maintain steady state voltage and frequency. It has been demonstrated by testing that the instability is only significant during unloaded operations, particularly start-up.

The proposed amendment will modify the acceptance criteria for a surveillance test that verifies the capability of the EDGs to be ready to supply the required safety related equipment within the time assumed in the safety analysis for the limiting accident. This testing is performed with the EDG breaker open. The set-up on the EDG governor is the primary consideration as to whether the EDG can satisfy the requirements of the surveillance. A fragile balance exists between the stability of the EDG and the speed at which it accelerates to rated nominal values. With minor degradation, the EDG will not be stable enough to satisfy the existing acceptance criteria, or the EDG will not provide rated voltage and frequency within the 10 seconds.

The EDG output breaker requires conditions to be satisfied before it will automatically close. One of these permissives is a de-energized bus; another is voltage and frequency within a specified range. Once these permissives are met, the breaker will close. With the breaker closed, the governor is essentially locked in and the EDG output is highly stable. The EDG is periodically tested with the breaker closing to verify that this capability (representative of a LOOP) is maintained. The testing performed with the breaker open only verifies the acceleration of the EDG and the voltage and frequency range that a steady state condition would provide.

Replacing the existing surveillance requirement with two separate requirements that more closely follow the postulated accident scenario, will give a benefit to the plant without decreasing confidence in the capability of the EDG. The benefits will include fewer test deficiencies and more stable output. There is no effect on the EDG capability to supply the

minimum voltage and frequency required within the 10 second acceptance or the steady state voltage and frequency required by the accident analysis. Design calculations DC-836-008 and DC-960-002 were reviewed and this change does not invalidate either the assumptions or the conclusions of the calculations. The EDGs will continue to perform their intended safety function per the design and licensing basis of the plant. This surveillance requirement has been incorporated into the Westinghouse improved Standardized Technical Specifications, NUREG 1431, through the approval of the Technical Specification Task Force traveler, TSTF-163.

TS 3.8.1.1, Action b.2

The normal TS surveillance testing schedule assures that operable EDG(S) are capable of performing their intended safety functions. A failure of one EDG does not reduce the reliability of another, otherwise operable EDG. Deleting this requirement does not affect the design or performance characteristics of the EDGs, once a common mode failure has been dismissed. Therefore, the EDGs maintain their ability to perform their design function. Many common cause failures are readily apparent with normal testing frequency and additional starts can cause premature wear and additional failures. NUREG 1366, Improvements to Technical Specifications Surveillance Requirements, Section 10, discusses the impact on EDG reliability from excessive fast starts and loading. A recommendation was presented that would require the remaining diesel generator(s) to be tested when the cause for inoperability has not been conclusively demonstrated to preclude the potential for a common mode failure. A similar change was incorporated into the Westinghouse ISTS, NUREG 1431, during initial approval by the NRC.

TS 4.8.1.1.2.d and e

Due to the importance of the EDG in accident analysis, many activities are performed to assure that the EDG will start and run for a minimum period of time. The EDG fuel oil is therefore, tested before adding to the tanks and on an established frequency to assure the fuel oil meets specific acceptance criteria and will not degrade the capability of the EDG. This surveillance program is taken from ASTM standards. Since the publishing of the original fuel oil standards, changes have occurred both to testing methods and fuel oils. Testing the fuel oil beyond what is required to assure the quality meets specific acceptance criteria does not provide additional margin against EDG failures to satisfy its design function. Some of the testing requirements in the ASTM standards are out of date or not specifically applicable to EDGs in nuclear applications.

Allowing the proposed flexibility in the applicability of the ASTM standards pertaining to fuel oil surveillance testing will permit VCSNS to perform only those portions of the standards that are required to assure EDG fuel oil quality. Several of the applicable standards are written for or can also be used in the aviation fuel industry. Newer standards may have different requirements that perform the same function. New requirements may cause fuel oil characteristics to change. Alternative but equivalent methodologies may be established to achieve the same results. This change is required to resolve verbatim compliance conflicts within the TS.

The quality of the fuel oil will continue to be a priority at VCSNS, and the fuel oil surveillance program, as defined in plant procedures, will remain governed by regulations. The ASTM standards recommended in the regulatory guides will continue to provide the guidance for the testing methods and acceptance criteria.

The administrative changes are being made to improve readability of the surveillance requirement and acceptance criteria for EDG fuel oil viscosity testing. Fuel oil testing is performed at a specific temperature to ensure consistent and repeatable results. Also the acceptance criterion is an established range as approved for other tests on the EDG fuel oil. Both of the administrative changes allow the surveillance requirement to read like the other tests for the fuel oil.

5.0 REGULATORY SAFETY ANALYSIS

5.1 NO SIGNIFICANT HAZARDS CONSIDERATION

South Carolina Electric & Gas Company (SCE&G) has evaluated the proposed changes to the VCSNS TS described above against the Significant Hazards Criteria of 10 CFR 50.92 and has determined that the changes do not involve any significant hazard. The following is provided in support of this conclusion.

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

This proposed amendment modifies an EDG Surveillance Requirement and does not impact the offsite AC distribution system; therefore the probability of any LOOP, including one concurrent with a LOCA is not significantly increased.

The proposed change revises the SR to better match the plant conditions during the test. SR 4.8.1.1.2.f.1 and 4.8.1.1.2.g.5 are performed with the EDG unloaded and as a result, overshoots its target nominal voltage and frequency during the test. In an actual event, the EDG would be almost immediately loaded once minimum voltage and frequency requirements are satisfied, thereby minimizing the overshoot.

To ensure the EDGs are capable of fulfilling their safety function, the proposed SR requires EDG voltage and frequency to achieve the specified minimum acceptable valued within 10 seconds, and to settle to a steady state voltage and frequency within the minimum and maximum values. That is, the upper limits are only applicable for steady state operation and do not apply during the transient portion of the EDG start. This change revises the acceptance criteria of 4.8.1.1.2.f.1 and 4.8.1.1.2.g.5 to clarify which voltage and frequency limits are applicable during the transient and steady state portions of the EDG start test.

This change does not affect the EDGs ability to supply the minimum voltage and frequency within 10 seconds or the steady state voltage and frequency required by the FSAR. The

EDGs will continue to perform their intended safety function, in accordance with the safety analysis. Thus, the consequences of any previously analyzed event are not significantly increased by this change.

The proposed change to 3.8.1.1, Action b.2 will not increase the probability or consequences of an accident previously evaluated. The change to this requirement to allow determination of no common cause failure mechanism has no impact on any accident. This change allows for not testing the redundant EDG if it can be demonstrated the failure mechanism of the affected EDG is not common cause. The normal TS surveillance testing schedule assures that operable EDG(s) are capable of performing their intended safety functions. The revision to the footnote on page 3/4.8-1 assures the action will be completed even if the EDG is restored to operable status within the action completion time.

The proposed revision to the fuel oil surveillance program will not preclude the EDGs from fulfilling their design functions. These changes provide flexibility to the testing program and continue to provide assurances that the fuel oil is acceptable for sustained engine operation. Eliminating or revising methodologies for testing of the fuel oil will not increase any probabilities or consequences to any accident previously evaluated.

2. The proposed amendment will not create the possibility of a new or different kind of accident from any accident previously evaluated.

The change revises SR 4.8.1.1.2.f.1 requirements to clarify which voltage and frequency limits are applicable during the transient and steady state portions of the EDG start testing. No changes are being made in equipment hardware or software, operational philosophy, testing frequency, how the system actually operates, or how the system is physically tested. Therefore, the proposed amendment will not create the possibility of a new or different kind of accident from any accident previously evaluated.

The elimination of unnecessary surveillance testing does not affect the design bases of the EDGs. The EDGs are designed to provide electrical power to the equipment important for safety during all modes and plant conditions following a loss of offsite power. The proposed changes to the Action requirements are consistent with NUREG-1431, NUREG-1366, Generic Letter 93-05, industry operating experience, and VCS operating experience. These changes are intended to improve plant safety, decrease equipment degradation, and remove unnecessary burden on personnel resources by reducing the amount of testing that the Technical Specification requires during power operation.

The revision to the fuel oil testing methodology does not impact the capabilities or functions of the EDGs. This testing methodology change will continue to assure the EDG is not degraded due to the fuel oil used. Existing test methodologies and guidance will continue to be followed, unless an evaluation demonstrates another methodology is as effective. Since the changes do not adversely impact important to safety equipment that is used in mitigating an accident, they will not create the possibility of an accident different from any previously evaluated.

3. The proposed amendment will not involve a significant reduction in a margin of safety.

The EDGs will still perform their intended safety function, in accordance with the VCSNS accident analysis. The revised test acceptance criteria are a much better match for the tested condition (unloaded). The performance of other TS Surveillance Requirements (in particular 4.8.1.1.2 g.4.b, 4.8.1.1.2g.6 and 4.8.1.1.2g.14) demonstrate EDG operability in conditions that are more representative of postulated accident conditions (loaded in the actual time sequence assumed in the accident analysis). The proposed amendment does not alter any acceptance criteria or equipment testing scope, which could impact the accident analysis.

The proposed change to exempt specific surveillance testing, as long as potential common cause can be ruled out, and eliminate unnecessary mechanical stress and wear on the diesel generator is an effort to improve plant reliability and safety. These changes are consistent with NUREG-1431, NUREG-1366, industry operating experience, and VCS operating experience and do not adversely affect the design bases, accident analysis, reliability or capability of the EDGs to perform their intended safety function. The revised footnote will assure that once the action is initiated, it will be completed regardless of when the EDG is restored to operability.

The proposed change to the fuel oil testing methodology has no impact on any safety margin. Accident analysis requires that the EDGs provide electric power to selected components during an accident scenario. The fuel oil quality will continue to meet established acceptance criteria and support the design function of the EDGs.

Since the design and licensing basis of the plant is unaffected, the proposed amendment will not involve a significant reduction in a margin of safety.

5.2 APPLICABLE REGULATORY REQUIREMENTS / CRITERIA

10 CFR 50.36 (c) (3), Surveillance Requirements stipulates that surveillances be performed to assure the necessary quality of systems and components be maintained, the facility operation will be within safety limits, and that the limiting condition for operation will be met.

10 CFR 50 Appendix A, Criterion 18, Inspection and Testing Of Electric Power Systems and 10 CFR 50 Appendix B, Criterion XI, Test Control, both require established programs for assuring that the SSC is demonstrated operable on a periodic basis.

Regulatory Guide (RG) 1.9, regulatory position C.5 states that each Diesel Engine be capable of starting and accelerating to rated speed, in the required sequence, all the necessary Engineered Safeguards Features and Emergency Shutdown loads. RG 1.108, regulatory position C.2.a(1) states that at least once per 18 months, the EDG must be started and attain the required voltage and frequency within acceptable limits and times. This demonstration is also required to be performed on a periodic basis during normal operations.

The proposed change does not violate any requirement or recommended method for assuring the operability of the EDG and maintaining the plant design and licensing basis. The change verifies the required parameters are within the prescribed limits and independently verifies that the time assumed in the accident analysis is satisfied. This testing is performed at the stipulated frequencies to assure continued operability of the EDG.

Regulatory Guide 1.93, regulatory position C states that whenever the Technical Specifications allow power operation to continue during a specific degradation level, such continued power operation should be contingent on (a) immediate verification of the availability and integrity of the remaining sources, (b) re-evaluation of the availability of the remaining diesel-generator(s) at a time interval.

The proposed change does not change the requirement for immediate verification of the offsite sources and continues to require re-evaluation of the remaining operable EDG. This change allows the re-evaluation to consider the failure mechanism and determine the potential impact on the unaffected train due to common cause. If the determination is that the failure did not involve a likely common cause mechanism, the unaffected EDG will not require testing to provide assurance of continued operability.

Regulatory Guide 1.137 provides the regulatory guidance that is needed to establish an acceptable fuel oil program for the EDGs. Over the years, many standards have evolved without causing an associated change to the Regulatory Guide. The proposed changes to the fuel oil surveillance program will continue to utilize most of the ASTM standards identified in the ANSI standard and the Regulatory Guide, with emphasis on the intent of the guidance rather than on literal compliance.

6.0 ENVIRONMENTAL CONSIDERATION

SCE&G has determined that the proposed amendment would change requirements with respect to the installation or use of a facility component located within the restricted area, as defined in 10 CFR 20 (Reference 3), or would change an inspection or surveillance requirement. SCE&G has evaluated the proposed change and has determined that the change does not involve, (i) a significant hazards consideration, (ii) a significant change in the types of 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. As discussed above, the proposed changes do not involve a significant hazards consideration. Accordingly, the proposed change meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51 (Reference 4), specifically 10 CFR 51.22(c)(9). Therefore, pursuant 10 CFR 51.22(b), an environmental assessment of the proposed change is not required.

Attachment To License Amendment No. XXX
To Facility Operating License No. NPF-12
Docket No. 50-395

Replace the following page of the Appendix A Technical Specifications with the attached revised page. The revised page is identified by amendment number and contains a marginal line indicating the area of change.

<u>Remove Page</u>	<u>Insert Page</u>
3/4 8-1	3/4 8-1
3/4 8-2	3/4 8-2
3/4 8-3	3/4 8-3
3/4 8-4	3/4 8-4
3/4 8-5	3/4 8-5
B 3/4 8-1	B 3/4 8-1
B 3/4 8-2	B 3/4 8-2
B 3/4 8-3	B 3/4 8-3

SCE&G -- EXPLANATION OF CHANGES SUMMARY

<u>Page</u>	<u>Affected Section</u>	<u>Bar #</u>	<u>Description of Change</u>	<u>Reason for Change</u>
3/4 8-1	3.8.1.1. Action b.2	1	Revising action to permit not testing redundant EDG if failure is not common cause.	Conformance with NUREG 1431 and eliminate unnecessary testing.
3/4 8-1	3.8.1.1. Action b.2 Footnote	2	Revise footnote to complete action.	Provide assurance that the action will be completed regardless to when the EDG is restored to Operable status.
3/4 8-2	3.8.1.1. Action c.2	1	Revising action to permit not testing redundant EDG if failure is not common cause.	Conformance with NUREG 1431 and eliminate unnecessary testing.
3/4 8-3	4.8.1.1.2. d	1	Revising wording from "in accordance with" to "based on".	Resolve verbatim compliance concerns in the TS.
3/4 8-3	4.8.1.1.2. d.1	2	Revising wording from "in accordance with" to "based on".	Resolve verbatim compliance concerns in the TS.
3/4 8-3	4.8.1.1.2. d.1.b	3	Change word "of" to "at".	Administrative change to correct mistake from Am 121.
3/4 8-3	4.8.1.1.2. d.1.b	4	Remove word "not".	Administrative change to correct mistake from Am 93.

SCE&G -- EXPLANATION OF CHANGES SUMMARY

<u>Page</u>	<u>Affected Section</u>	<u>Bar #</u>	<u>Description of Change</u>	<u>Reason for Change</u>
3/4 8-4	4.8.1.1.2. d.1.d	1	Revising wording from "in accordance with" to "based on". Removing words "with proper color."	Resolve verbatim compliance concerns in the TS. Dye in fuel oil not meeting color requirements of standards.
3/4 8-4	4.8.1.1.2. d.2	2	Revising wording from "in accordance with" to "based on".	Resolve verbatim compliance concerns in the TS.
3/4 8-4	4.8.1.1.2. e	3	Revising wording from "in accordance with" to "based on".	Resolve verbatim compliance concerns in the TS.
3/4 8-4	4.8.1.1.2. f.1	4	Revising periodic surveillance requirement to reflect actual plant conditions during the test.	Root Cause Evaluation 01-0235 determined that the setup of the governor to meet the requirement was not optimum.
3/4 8-5	4.8.1.1.2. g.5	1	Revising periodic surveillance requirement to reflect actual plant conditions during the test.	Root Cause Evaluation 01-0235 determined that the setup of the governor to meet the requirement was not optimum.
B 3/4 8-1	B 3/4.8.1, B 3/4.8.2, B 3/4.8.3	1	Address the requirements associated with the actions related to common cause failures.	Conformance with NUREG 1431.
B 3/4 8-2	B 3/4.8.1, B 3/4.8.2, B 3/4.8.3	1	Address the change in surveillance requirement and effect on commitments to Regulatory Guides.	Root Cause Evaluation 01-0235 determined that the setup of the governor to meet the requirement was not optimum.
B 3/4 8-3	B 3/4.8.1, B 3/4.8.2, B 3/4.8.3	1	Pagination only.	Pagination.

PROPOSED TECHNICAL SPECIFICATION CHANGES (MARK-UP)

Insert 1 - Action b.2

2. *If the EDG became inoperable due to any cause other than preplanned preventative maintenance or testing:
 - a) determine the OPERABLE EDG is not inoperable due to a common cause failure within 24 hours, or
 - b) demonstrate the OPERABILITY of the remaining EDG by performing Surveillance Requirement 4.8.1.1.2.a.3 within 24 hours, and

Insert 2 - Footnote

- * Completion of Action b.2 is required regardless of when the inoperable EDG is restored to OPERABILITY.

Insert 3 - Surveillance Requirement 4.8.1.1.2.f.1

1. Verify each EDG starts from standby conditions and:
 - a) In less than or equal to 10 seconds, achieves a voltage greater than 6480 volts (7200 - 720 volts) and a frequency greater than 58.8 Hz (60 - 1.2 Hz).
 - b) Achieve a steady state voltage greater than 6480 volts but less than 7920 volts and a steady state frequency greater than 58.8 Hz but less than 61.2 Hz.

Insert 4 - Surveillance Requirement 4.8.1.1.2.g.5

Verify that the EDG starts from standby conditions and in less than or equal to 10 seconds, achieves a voltage greater than 6480 volts and a frequency greater than 58.8 Hz. After steady state operation is obtained, the EDG shall be verified to have a voltage greater than 6480 volts but less than 7920 volts and a frequency greater than 58.8 Hz but less than 61.2 Hz.

Insert 5 - Bases Section 3.8.1

If it can be determined that the cause of the inoperable diesel generator does not exist on the OPERABLE diesel generator, than Surveillance 4.8.1.1.2.a.3 does not have to be performed. If the cause of the initial inoperable diesel generator cannot be confirmed not to exist on the redundant diesel generator, performance of Surveillance Requirement 4.8.1.1.2.a.3 suffices to provide assurance of continued OPERABILITY of that diesel generator. This allows for reduced start testing of the diesel generators, which has been shown to be a factor in engine degradation.

In the event that the inoperable diesel generator is restored to OPERABLE status prior to completing either the evaluation of cause or performing the surveillance requirement, the CER program will continue to evaluate the common cause possibility. This continued evaluation, however, is no longer under the 24 hour constraint imposed by the action statement. According to Generic Letter 84-15, "Proposed Staff Actions to Improve and Maintain Diesel Generator Reliability," 24 hours is reasonable to confirm that the OPERABLE diesel generator is not affected by the same problem as the inoperable diesel generator.

Insert 6 - Bases Section 3.8.1

The Surveillance Requirement that assures the diesel generator is capable of performing its design function follows the guidance of NUREG 1366 and NUREG 1431, Rev 2. The surveillance tests the capability of the diesel generator to start and close its breaker in the required 10 seconds to support the accident analysis, and carry the required electrical load while maintaining the voltage and frequency limits necessary to assure OPERABILITY of the loads.

In addition to the Surveillance Requirements, the time for the diesel generator to reach steady state operation, unless the modified start method is utilized, is periodically monitored and the trend evaluated to identify degradation of the governor and voltage regulator performance.

3/4.8 ELECTRICAL POWER SYSTEMS

3/4.8.1 A.C. SOURCES

OPERATING

LIMITING CONDITION FOR OPERATION

- 3.8.1.1 As a minimum, the following A.C. electrical power sources shall be OPERABLE:
- a. Two physically independent circuits between the offsite transmission network and the onsite Class 1E distribution system, and
 - b. Two separate and independent Emergency Diesel Generators (EDG), each with:
 - 1. A separate day fuel tank containing a minimum volume of 360 gallons of fuel,
 - 2. A separate fuel storage system containing a minimum volume of 48,500 gallons of fuel, and
 - 3. A separate fuel transfer pump.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

- a. With one offsite circuit of 3.8.1.1.a inoperable:
 - 1. Demonstrate the OPERABILITY of the remaining offsite A.C. sources by performing Surveillance Requirement 4.8.1.1.1 within 1 hour and at least once per 8 hours thereafter, and
 - 2. If either EDG has not been successfully tested within the past 24 hours, demonstrate its OPERABILITY by performing Surveillance Requirement 4.8.1.2.a.3 separately for each such EDG within 24 hours unless the diesel is already operating, and
 - 3. Restore the offsite circuit to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and COLD SHUTDOWN within the following 30 hours.
- b. With one EDG of 3.8.1.1.b inoperable:
 - 1. Demonstrate the OPERABILITY of the A.C. offsite sources by performing Surveillance Requirement 4.8.1.1.1 within 1 hour and at least once per 8 hours thereafter, and

Replace with insert 1

2. ~~If the EDG became inoperable due to any cause other than preplanned preventive maintenance or testing, demonstrate the OPERABILITY of the remaining EDG by performing Surveillance Requirements 4.8.1.2.a.3 within 24 hours*, and~~

Replace with insert 2

* ~~This test is required to be completed regardless of when the inoperable EDG is restored to OPERABILITY.~~

ELECTRICAL POWER SYSTEMS

LIMITING CONDITION FOR OPERATION

ACTION: (Continued)

3. Within 2 hours, verify that required systems, subsystems, trains components and devices that depend on the remaining EDG as a source of emergency power are also OPERABLE and in MODE 1, 2, or 3, that the Turbine Driven Emergency Feed Pump is OPERABLE. If these conditions are not satisfied within 2 hours be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
 4. Restore the EDG to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
- c. With one offsite circuit and one EDG inoperable:
1. Demonstrate the OPERABILITY of the remaining offsite A.C. source by performing Surveillance Requirement 4.8.1.1.1 within one hour and at least once per 8 hours thereafter, and
 2. insert
1 ~~If the EDG became inoperable due to any cause other than unplanned preventive maintenance or testing, demonstrate the OPERABILITY of the remaining EDG by performing Surveillance Requirement 4.8.1.1.2.a.3 within 8 hours*, and~~
 3. Within 2 hours, verify that required systems, subsystems, trains, components and devices that depend on the remaining EDG as source of emergency power are also OPERABLE and in MODE 1, 2, or 3. That the Turbine Driven Emergency Feed Pump is OPERABLE. If these conditions are not satisfied within 2 hours be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
 4. Restore one of the inoperable sources to OPERABLE status within 12 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours, and
 5. Restore the other A.C. power source (offsite circuit or diesel generator) to OPERABLE status in accordance with the provisions of Section 3.8.1.1 Action Statement a. or b., as appropriate, with the time requirement of that Action Statement based on the time of initial loss of the remaining inoperable A. C. power source.

*This test is required to be completed regardless of when the inoperable EDG is restored to OPERABILITY.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- 4.8.1.1.2 Each EDG shall be demonstrated OPERABLE:
- a. At least once per 31 days on a STAGGERED TEST BASIS by:
 1. Verifying the fuel level in the day tank and fuel storage tank.
 2. Verifying the fuel transfer pump can be started and transfers fuel from the storage system to the day tank.
 3. Verifying the diesel generator can start* and accelerate to synchronous speed (504 rpm) with generator voltage and frequency at 7200 ± 720 volts and 60 ± 1.2 Hz.
 4. Verifying the generator is synchronized, gradually loaded* to an indicated 4150-4250 kW** and operates for at least 60 minutes.
 - b. At least once per 31 days and after each operation of the diesel where the period of operation was greater than or equal to 1 hour by removing accumulated water from the day tank.
 - c. At least once per 31 days by checking for and removing accumulated water from the fuel oil storage tanks;
 - d. By sampling new fuel oil ^{based on} ~~in accordance with~~ the applicable ASTM standard prior to addition to storage tanks and:
 1. By verifying in accordance with the tests ^{BASED ON THE} ~~specified in the~~ applicable ASTM standard prior to addition to the storage tanks that the sample has:
 - a) An API Gravity of within 0.3 degrees at 60°F or a specific gravity of within 0.0016 at 60/60°F, when compared to the supplier's certificate, or an absolute specific gravity at 60/60°F of greater than or equal to 0.83 but less than or equal to 0.89, or an API gravity of greater than or equal to 27 degrees but less than or equal to 39 degrees;
 - b) A kinematic viscosity ^{at} of 40°C of greater than or equal to 1.9 centistokes, but less than or equal to 4.1 centistokes (alternatively, Saybolt viscosity, SUS at 100°F of greater than or equal to 32.6, but ~~not~~ less than or equal to 40.1), if gravity was not determined by comparison with the supplier's certification;

*This test shall be conducted in accordance with the manufacturer's recommendations regarding engine prelude and warmup procedures, and as applicable regarding loading recommendations.

** This band is meant as guidance to avoid routine overloading of the engine. Loads in excess of this band shall not invalidate the test.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- c) A flash point equal to or greater than 125°F; and
- d) A clear and bright appearance ~~with proper color~~ when tested ~~in accordance with~~ the applicable ASTM standard. *Based on* ✓
- 2. By verifying within 30 days of obtaining the sample that the specified properties are met when tested ~~in accordance with~~ the applicable ASTM standard. *based on* ✓
- e. *based on* At least once every 31 days by obtaining a sample of fuel oil ~~in accordance with~~ the applicable ASTM standard, and verifying that total contamination is less than 10 mg/liter when checked ~~in accordance with~~ the applicable ASTM standard. *based on* ✓
- f. At least once per 184 days by:
 - 1. *replace with Insert 3* ~~Starting and accelerating the EDG to synchronous speed (504 rpm) with generator voltage and frequency at 7200 ± 720 volts and 60 ± 1.2 Hz within 10 seconds after the start signal. The EDG shall be started for this test by using one of the following signals:~~
 - a) Simulated loss of offsite power by itself.
 - b) Simulated loss of offsite power in conjunction with an ESF actuation test signal.
 - c) An ESF actuation test signal by itself.
 - d) Simulated degraded offsite power by itself.
 - e) Manual.
 - 2. The generator shall be manually synchronized, loaded to an indicated 4150-4250 kW** in less than or equal to 60 seconds, and operate for at least 60 minutes.
- g. At least once every 18 months by:
 - 1. Subjecting the diesel to an inspection in accordance with procedures prepared in conjunction with its manufacturer's recommendations for this class of standby service,
 - 2. Verifying that on rejection of a load of greater than or equal to 729, the voltage and frequency are maintained at 7200 ± 720 volts and frequency at 60 ± 1.2 Hz.
 - 3. Verifying the generator capability to reject a load of 4250 kW without tripping. The generator voltage shall not exceed 7920 volts during and following the load rejection.

** This band is meant as guidance to avoid routine overloading of the engine. Loads in excess of this band shall not invalidate the test.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

4. Simulating a loss of offsite power by itself, and:
- a) Verifying de-energization of the emergency busses and load shedding from the emergency busses.
 - b) Verifying the diesel starts on the auto-start signal, energizes the emergency busses with permanently connected loads within 10 seconds, energizes the auto-connected shutdown loads through the load sequencer and operates for greater than or equal to 5 minutes while its generator is loaded with the shutdown loads. After energization of these loads, the steady-state voltage and frequency shall be maintained at 7200 ± 720 volts and 60 ± 1.2 Hz.

replace
with Insert
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5. Verifying that on an ESF actuation test signal, without loss of offsite power, the diesel generator starts on the auto-start signal and operates on standby for greater than or equal to 5 minutes. ~~The generator voltage and frequency shall be 7200 ± 720 volts and 60 ± 1.2 Hz within 10 seconds after the auto-start signal; the steady-state generator voltage and frequency shall be maintained within these limits during this test.~~ After 5 minutes of standby operation verify that on a simulated loss of offsite power:

- a) the loads are shed from the emergency busses,
- b) the diesel generator does not connect to the bus for at least 5 seconds, and
- c) that subsequent loading of the diesel generator is in accordance with design requirements.

6. Simulating a loss of offsite power in conjunction with an ESF actuation test signal, and

- a) Verifying de-energization of the emergency busses and load shedding from the emergency busses.
- b) Verifying the EDG starts in the emergency mode, energizes the emergency busses with permanently connected loads within 10 seconds, energizes the auto-connected emergency (accident) loads through the load sequencer and operates for greater than or equal to 5 minutes and maintains the steady state voltage and frequency at 7200 ± 720 volts and 60 ± 1.2 Hz.
- c) Verifying that all EDG trips, except engine overspeed, generator differential and low lube oil pressure are automatically bypassed upon loss of voltage on the emergency bus concurrent with a safety injection actuation signal.

3/4.8 ELECTRICAL POWER SYSTEMS

BASES

3/4.8.1, 3/4.8.2 AND 3/4.8.3 A.C. SOURCES, D.C. SOURCES AND ONSITE POWER DISTRIBUTION SYSTEMS

The OPERABILITY of the A.C. and D.C. power sources and associated distribution systems during operation ensures that sufficient power will be available to supply the safety related equipment required for 1) the safe shutdown of the facility and 2) the mitigation and control of accident conditions within the facility. The minimum specified independent and redundant A.C. and D.C. power sources and distribution systems satisfy the requirements of General Design Criterion 17 of Appendix "A" to 10 CFR 50.

The ACTION requirements specified for the levels of degradation of the power sources provide restriction upon continued facility operation commensurate with the level of degradation. The OPERABILITY of the power sources are consistent with the initial condition assumptions of the safety analyses and are based upon maintaining at least one redundant set of onsite A.C. and D.C. power sources and associated distribution systems OPERABLE during accident conditions coincident with an assumed loss of offsite power and single failure of the other onsite A.C. source. The A.C. and D.C. source allowable out-of-service times are based on Regulatory Guide 1.93, "Availability of Electrical Power Sources," December 1974. When one diesel generator is inoperable, there is an additional ACTION requirement to verify that all required systems, subsystems, trains, components and devices, that depend on the remaining OPERABLE diesel generator as a source of emergency power, are also OPERABLE, and that the steam-driven auxiliary feedwater pump is OPERABLE. This requirement is intended to provide assurance that a loss of offsite power event will not result in a complete loss of safety function of critical systems during the period one of the diesel generators is inoperable. The term verify as used in this context means to administratively check by examining logs or other information to determine if certain components are out-of-service for maintenance or other reasons. It does not mean to perform the surveillance requirements needed to demonstrate the OPERABILITY of the component.

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→ The OPERABILITY of the minimum specified A.C. and D.C. power sources and associated distribution systems during shutdown and refueling ensures that 1) the facility can be maintained in the shutdown or refueling condition for extended time periods and 2) sufficient instrumentation and control capability is available for monitoring and maintaining the unit status.

The Surveillance Requirements for demonstrating the OPERABILITY of the diesel generators are in accordance with the recommendations of Regulatory Guides 1.9, "Selection of Diesel Generator Set Capacity for Standby Power Supplies," March 10, 1971, and 1.137, "Fuel-Oil Systems for Standby Diesel Generators," Revision 1, October 1979, as modified by the NRC's review and approval of South Carolina Electric & Gas Company's June 10, 1985, December 6, 1985 and November 10, 2000 amendment requests.

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→ The fuel storage system minimum volume of fuel to demonstrate operability of the diesel generators was based on fuel consumption determined from the development of time dependent loads following a design basis accident and a loss of off-site power utilizing FSAR Table 8.3-3 for seven days.

4
4
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REAGINATION ONLY

ELECTRIC POWER SYSTEMS

BASES

A.C. SOURCES, D.C. SOURCES, AND ONSITE POWER DISTRIBUTION SYSTEMS

(Continued)

All safety-related portions of the VCSNS diesel engine fuel oil storage and transfer system, are Seismic Category I, Safety Class 2b, and designed to ANSI Standard N195-1976 with the provision listed below:

VCSNS will maintain at least 2% margin above the minimum calculated seven day required volume during Modes 1-4. This is an exception to ANSI N195-1976, "Fuel Oil Systems for Standby Diesel Generators," Section 5.4, during Modes 1-4. EDG fuel replenishment is available from multiple sources, including off-site suppliers, on-site non safety storage in the Auxiliary Boiler Fuel Tank, and the ability to provide fuel from the opposite train EDG Fuel Oil Storage Tank via the fuel oil and transfer system cross-tie.

The 10% fuel margin as recommended in Regulatory Guide 1.137, Revision 1, "Fuel-Oil Systems for Standby Diesel Generators," position C.1.c.(2) will be met during Modes 5 and 6.

The Surveillance Requirement for demonstrating the OPERABILITY of the Station batteries are based on the recommendations of Regulatory Guide 1.129, "Maintenance Testing and Replacement of Large Lead Storage Batteries for Nuclear Power Plants," February 1978, and IEEE Std 450-1987, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Large Lead Storage Batteries for Generating Stations and Substations."

Verifying average electrolyte temperature above the minimum for which the battery was sized, total battery terminal voltage and float charge, connection resistance values and the performance of battery service and discharge tests ensures the effectiveness of the charging system, the ability to handle high discharge rates and compares the battery capacity at that time with the rated capacity.

Table 4.8-2 specifies the normal limits for each designated pilot cell and each connected cell for electrolyte level, float voltage and specific gravity. The limits for the designated pilot cells float voltage and specific gravity, greater than 2.13 volts and .015 below the manufacturer's full charge specific gravity or a battery charger current that had stabilized at a low value, is characteristic of a charged cell with adequate capacity. The normal limits for each connected cell for float voltage and specific gravity, greater than 2.13 volts and not more than .020 below the manufacturer's full charge specific gravity with an average specific gravity of all the connected cells not more than .010 below the manufacturer's full charge specific gravity, ensures the OPERABILITY and capability of the battery.

Operation with a battery cell's parameter outside the normal limit but within the allowable value specified in Table 4.8-2 is permitted for up to 7 days. During this 7 day period: (1) the allowable values for electrolyte level ensures no physical damage to the plates with an adequate electron transfer capability; (2) the allowable value for the average specific gravity of all the cells, not more than .020 below the manufacturer's recommended full charge specific gravity, ensures that the decrease in rating will be less than the safety margin provided in sizing; (3) the allowable value for an individual cell's specific gravity, ensures that an individual cell's specific gravity will not be more than .040 below the manufacturer's full charge specific gravity and that the overall capability of the battery will be maintained within an acceptable limit, and (4) the allowable value for an individual cell's float voltage, greater than 2.07 volts, ensures the battery's capability to perform its design function.

RE Agination Only

ELECTRICAL POWER SYSTEMS

BASES

3/4.8.4 ELECTRICAL EQUIPMENT PROTECTIVE DEVICES

Containment electrical penetrations and penetration conductors are protected by either deenergizing circuits not required during reactor operation or by demonstrating the OPERABILITY of primary and backup overcurrent protection circuit breakers during periodic surveillance.

The surveillance requirements applicable to lower voltage circuit breakers provide assurance of breaker reliability by testing at least one representative sample of each manufacturer's brand of circuit breaker. Each manufacturer's molded case and metal case circuit breakers are grouped into representative samples which are then tested on a rotating basis to ensure that all breakers are tested. If a wide variety exists within any manufacturer's brand of circuit breakers, it is necessary to divide that manufacturer's breakers into groups and treat each group as a separate type of breaker for surveillance purposes.

The surveillance requirements of the circuit breakers for non-Class 1E cables located in trays which do not have cable tray covers and which provide protection for cables that, if faulted, could cause failure in both adjacent, redundant Class 1E cables ensures that the integrity of Class 1E cables is not compromised by the failure of protection devices to operate in the non-Class 1E cables.

PROPOSED TECHNICAL SPECIFICATION CHANGES (RETYPE)

3/4.8 ELECTRICAL POWER SYSTEMS

3/4.8.1 A.C. SOURCES

OPERATING

LIMITING CONDITION FOR OPERATION

3.8.1.1 As a minimum, the following A.C. electrical power sources shall be OPERABLE:

- a. Two physically independent circuits between the offsite transmission network and the onsite Class 1E distribution system, and
- b. Two separate and independent Emergency Diesel Generators (EDG), each with:
 1. A separate day fuel tank containing a minimum volume of 360 gallons of fuel,
 2. A separate fuel storage system containing a minimum volume of 48,500 gallons of fuel, and
 3. A separate fuel transfer pump.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

- a. With one offsite circuit of 3.8.1.1.a inoperable:
 1. Demonstrate the OPERABILITY of the remaining offsite A.C. sources by performing Surveillance Requirement 4.8.1.1.1 within 1 hour and at least once per 8 hours thereafter, and
 2. If either EDG has not been successfully tested within the past 24 hours, demonstrate its OPERABILITY by performing Surveillance Requirement 4.8.1.1.2.a.3 separately for each such EDG within 24 hours unless the diesel is already operating, and
 3. Restore the offsite circuit to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and COLD SHUTDOWN within the following 30 hours.
- b. With one EDG of 3.8.1.1.b inoperable:
 1. Demonstrate the OPERABILITY of the A.C. offsite sources by performing Surveillance Requirement 4.8.1.1.1 within 1 hour and at least once per 8 hours thereafter, and
 2. *If the EDG became inoperable due to any cause other than preplanned preventive maintenance or testing:
 - a) determine the OPERABLE EDG is not inoperable due to a common cause failure within 24 hours, or
 - b) demonstrate the OPERABILITY of the remaining EDG by performing Surveillance Requirement 4.8.1.1.2.a.3 within 24 hours, and

* Completion of Action b.2 is required regardless of when the inoperable EDG is restored to OPERABILITY.

ELECTRICAL POWER SYSTEMS

LIMITING CONDITION FOR OPERATION

ACTION: (Continued)

3. Within 2 hours, verify that required systems, subsystems, trains, components and devices that depend on the remaining EDG as a source of emergency power are also OPERABLE and in MODE 1, 2, or 3, that the Turbine Driven Emergency Feed Pump is OPERABLE. If these conditions are not satisfied within 2 hours be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
 4. Restore the EDG to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
- c. With one offsite circuit and one EDG inoperable:
1. Demonstrate the OPERABILITY of the remaining offsite A.C. source by performing Surveillance Requirement 4.8.1.1.1 within one hour and at least once per 8 hours thereafter, and
 2. *If the EDG became inoperable due to any cause other than preplanned preventative maintenance or testing:
 - a) determine the OPERABLE EDG is not inoperable due to a common cause failure within 24 hours, or
 - b) demonstrate the OPERABILITY of the remaining EDG by performing Surveillance Requirement 4.8.1.1.2.a.3 within 24 hours, and
 3. Within 2 hours, verify that required systems, subsystems, trains, components and devices that depend on the remaining EDG as source of emergency power are also OPERABLE and in MODE 1, 2, or 3, that the Turbine Driven Emergency Feed Pump is OPERABLE. If these conditions are not satisfied within 2 hours be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
 4. Restore one of the inoperable sources to OPERABLE status within 12 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours, and
 5. Restore the other A.C. power source (offsite circuit or diesel generator) to OPERABLE status in accordance with the provisions of Section 3.8.1.1 Action Statement a. or b., as appropriate, with the time requirement of that Action Statement based on the time of initial loss of the remaining inoperable A.C. power source.

* This test is required to be completed regardless of when the inoperable EDG is restored to OPERABILITY.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

4.8.1.1.2 Each EDG shall be demonstrated OPERABLE:

- a. At least once per 31 days on a STAGGERED TEST BASIS by:
 1. Verifying the fuel level in the day tank and fuel storage tank.
 2. Verifying the fuel transfer pump can be started and transfers fuel from the storage system to the day tank.
 3. Verifying the diesel generator can start* and accelerate to synchronous speed (504 rpm) with generator voltage and frequency at 7200 ± 720 volts and 60 ± 1.2 Hz.
 4. Verifying the generator is synchronized, gradually loaded* to an indicated 4150-4250 kW** and operates for at least 60 minutes.
- b. At least once per 31 days and after each operation of the diesel where the period of operation was greater than or equal to 1 hour by removing accumulated water from the day tank.
- c. At least once per 31 days by checking for and removing accumulated water from the fuel oil storage tanks;
- d. By sampling new fuel oil based on the applicable ASTM standard prior to addition to storage tanks and:
 1. By verifying in accordance with the tests based on the applicable ASTM standard prior to addition to the storage tanks that the sample has:
 - a) An API Gravity of within 0.3 degrees at 60°F or a specific gravity of within 0.0016 at 60/60°F, when compared to the supplier's certificate, or an absolute specific gravity at 60/60°F of greater than or equal to 0.83 but less than or equal to 0.89, or an API gravity of greater than or equal to 27 degrees but less than or equal to 39 degrees;
 - b) A kinematic viscosity at 40°C of greater than or equal to 1.9 centistokes, but less than or equal to 4.1 centistokes (alternatively, Saybolt viscosity, SUS at 100°F of greater than or equal to 32.6, but less than or equal to 40.1), if gravity was not determined by comparison with the supplier's certification;

* This test shall be conducted in accordance with the manufacturer's recommendations regarding engine prelube and warmup procedures, and as applicable regarding loading recommendations.

** This band is meant as guidance to avoid routine overloading of the engine. Loads in excess of this band shall not invalidate the test.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- c) A flash point equal to or greater than 125°F; and
 - d) A clear and bright appearance when tested based on the applicable ASTM standard.
2. By verifying within 30 days of obtaining the sample that the specified properties are met when tested based on the applicable ASTM standard.
- e. At least once every 31 days by obtaining a sample of fuel oil based on the applicable ASTM standard, and verifying that total contamination is less than 10 mg/liter when checked based on the applicable ASTM standard.
 - f. At least once per 184 days by:
 - 1. Verify each EDG starts from standby conditions and:
 - a) In less than or equal to 10 seconds, achieves a voltage greater than 6480 volts (7200 - 720 volts) and a frequency greater than 58.8 Hz (60 - 1.2 Hz).
 - b) Achieve a steady state voltage greater than 6480 volts but less than 7920 volts and a steady state frequency greater than 58.8 Hz but less than 61.2 Hz.
- The EDG shall be started for this test by using one of the following signals:
- a) Simulated loss of offsite power by itself.
 - b) Simulated loss of offsite power in conjunction with an ESF actuation test signal.
 - c) An ESF actuation test signal by itself.
 - d) Simulated degraded offsite power by itself.
 - e) Manual.
2. The generator shall be manually synchronized, loaded to an indicated 4150-4250 kW** in less than or equal to 60 seconds, and operate for at least 60 minutes.
- g. At least once every 18 months by:
 - 1. Subjecting the diesel to an inspection in accordance with procedures prepared in conjunction with its manufacturer's recommendations for this class of standby service,
 - 2. Verifying that on rejection of a load of greater than or equal to 729, the voltage and frequency are maintained at 7200 ± 720 volts and frequency at 60 ± 1.2 Hz.
 - 3. Verifying the generator capability to reject a load of 4250 kW without tripping. The generator voltage shall not exceed 7920 volts during and following the load rejection.

** This band is meant as guidance to avoid routine overloading of the engine. Loads in excess of this band shall not invalidate the test.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

4. Simulating a loss of offsite power by itself, and:
 - a) Verifying de-energization of the emergency busses and load shedding from the emergency busses.
 - b) Verifying the diesel starts on the auto-start signal, energizes the emergency busses with permanently connected loads within 10 seconds, energizes the auto-connected shutdown loads through the load sequencer and operates for greater than or equal to 5 minutes while its generator is loaded with the shutdown loads. After energization of these loads, the steady-state voltage and frequency shall be maintained at 7200 ± 720 volts and 60 ± 1.2 Hz.

5. Verifying that on an ESF actuation test signal, without loss of offsite power, the diesel generator starts on the auto-start signal and operates on standby for greater than or equal to 5 minutes. Verify that the EDG starts from standby conditions and in less than or equal to 10 seconds, achieves a voltage greater than 6480 volts and a frequency greater than 58.8 Hz. After steady state operation is obtained, the EDG shall be verified to have a voltage greater than 6480 volts but less than 7920 volts and a frequency greater than 58.8 Hz but less than 61.2 Hz. After 5 minutes of standby operation verify that on a simulated loss of offsite power:
 - a) the loads are shed from the emergency busses,
 - b) the diesel generator does not connect to the bus for at least 5 seconds, and
 - c) that subsequent loading of the diesel generator is in accordance with design requirements.

6. Simulating a loss of offsite power in conjunction with an ESF actuation test signal, and
 - a) Verifying de-energization of the emergency busses and load shedding from the emergency busses.
 - b) Verifying the EDG starts in the emergency mode, energizes the emergency busses with permanently connected loads within 10 seconds, energizes the auto-connected emergency (accident) loads through the load sequencer and operates for greater than or equal to 5 minutes and maintains the steady state voltage and frequency at 7200 ± 720 volts and 60 ± 1.2 Hz.
 - c) Verifying that all EDG trips, except engine overspeed, generator differential and low lube oil pressure are automatically bypassed upon loss of voltage on the emergency bus concurrent with a safety injection actuation signal.

3/4.8 ELECTRICAL POWER SYSTEMS

BASES

3/4.8.1, 3/4.8.2 AND 3/4.8.3 A.C. SOURCES, D.C. SOURCES AND ONSITE POWER DISTRIBUTION SYSTEMS

The OPERABILITY of the A.C. and D.C power sources and associated distribution systems during operation ensures that sufficient power will be available to supply the safety related equipment required for 1) the safe shutdown of the facility and 2) the mitigation and control of accident conditions within the facility. The minimum specified independent and redundant A.C. and D.C. power sources and distribution systems satisfy the requirements of General Design Criterion 17 of Appendix "A" to 10 CFR 50.

The ACTION requirements specified for the levels of degradation of the power sources provide restriction upon continued facility operation commensurate with the level of degradation. The OPERABILITY of the power sources are consistent with the initial condition assumptions of the safety analyses and are based upon maintaining at least one redundant set of onsite A.C. and D.C. power sources and associated distribution systems OPERABLE during accident conditions coincident with an assumed loss of offsite power and single failure of the other onsite A.C. source. The A.C. and D.C. source allowable out-of-service times are based on Regulatory Guide 1.93, "Availability of Electrical Power Sources," December 1974. When one diesel generator is inoperable, there is an additional ACTION requirement to verify that all required systems, subsystems, trains, components and devices, that depend on the remaining OPERABLE diesel generator as a source of emergency power, are also OPERABLE, and that the steam-driven auxiliary feedwater pump is OPERABLE. This requirement is intended to provide assurance that a loss of offsite power event will not result in a complete loss of safety function of critical systems during the period one of the diesel generators is inoperable. The term verify as used in this context means to administratively check by examining logs or other information to determine if certain components are out-of-service for maintenance or other reasons. It does not mean to perform the surveillance requirements needed to demonstrate the OPERABILITY of the component.

If it can be determined that the cause of the inoperable diesel generator does not exist on the OPERABLE diesel generator, than Surveillance 4.8.1.1.2.a.3 does not have to be performed. If the cause of the initial inoperable diesel generator cannot be confirmed not to exist on the redundant diesel generator, performance of Surveillance Requirement 4.8.1.1.2.a.3 suffices to provide assurance of continued OPERABILITY of that diesel generator. This allows for reduced start testing of the diesel generators, which has been shown to be a factor in engine degradation.

In the event that the inoperable diesel generator is restored to OPERABLE status prior to completing either the evaluation of cause or performing the surveillance requirement, the CER program will continue to evaluate the common cause possibility. This continued evaluation, however, is no longer under the 24 hour constraint imposed by the action statement. According to Generic Letter 84-15, "Proposed Staff Actions to Improve and Maintain Diesel Generator Reliability," 24 hours is reasonable to confirm that the OPERABLE diesel generator is not affected by the same problem as the inoperable diesel generator.

The OPERABILITY of the minimum specified A.C. and D.C. power sources and associated distribution systems during shutdown and refueling ensures that 1) the facility can be maintained in the shutdown or refueling condition for extended time periods and 2) sufficient instrumentation and control capability is available for monitoring and maintaining the unit status.

ELECTRICAL POWER SYSTEMS

BASES

A.C. SOURCES, D.C. SOURCES AND ONSITE POWER DISTRIBUTION SYSTEMS

(Continued)

The Surveillance Requirements for demonstrating the OPERABILITY of the diesel generators are in accordance with the recommendations of Regulatory Guides 1.9, "Selection of Diesel Generator Set Capacity for Standby Power Supplies," March 10, 1971, and 1.137, "Fuel-Oil Systems for Standby Diesel Generators," Revision 1, October 1979, as modified by the NRC's review and approval of South Carolina Electric & Gas Company's June 10, 1985, December 6, 1985, and November 10, 2000 amendment requests.

The Surveillance Requirement that assures the diesel generator is capable of performing its design function follows the guidance of NUREG 1366 and NUREG 1431, Rev 2. The surveillance tests the capability of the diesel generator to start and close its breaker in the required 10 seconds to support the accident analysis, and carry the required electrical load while maintaining the voltage and frequency limits necessary to assure OPERABILITY of the loads.

In addition to the Surveillance Requirements, the time for the diesel generator to reach steady state operation, unless the modified start method is utilized, is periodically monitored and the trend evaluated to identify degradation of the governor and voltage regulator performance.

The fuel storage system minimum volume of fuel to demonstrate operability of the diesel generators was based on fuel consumption determined from the development of time dependent loads following a design basis accident and a loss of off-site power utilizing FSAR Table 8.3-3 for seven days.

All safety-related portions of the VCSNS diesel engine fuel oil storage and transfer system, are Seismic Category I, Safety Class 2b, and designed to ANSI Standard N195-1976 with the provision listed below:

VCSNS will maintain at least 2% margin above the minimum calculated seven day required volume during Modes 1-4. This is an exception to ANSI N195-1976, "Fuel Oil Systems for Standby Diesel Generators," Section 5.4, during Modes 1-4. EDG fuel replenishment is available from multiple sources, including off-site suppliers, on-site non safety storage in the Auxiliary Boiler Fuel Tank, and the ability to provide fuel from the opposite train EDG Fuel Oil Storage Tank via the fuel oil and transfer system cross-tie.

The 10% fuel margin as recommended in Regulatory Guide 1.137, Revision 1, "Fuel-Oil Systems for Standby Diesel Generators," position C.1.c.(2) will be met during Modes 5 and 6.

The Surveillance Requirement for demonstrating the OPERABILITY of the Station batteries are based on the recommendations of Regulatory Guide 1.129, "Maintenance Testing and Replacement of Large Lead Storage Batteries for Nuclear Power Plants," February 1978, and IEEE Std 450-1987, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Large Lead Storage Batteries for Generating Stations and Substations."

Verifying average electrolyte temperature above the minimum for which the battery was sized, total battery terminal voltage and float charge, connection resistance values and the performance of battery service and discharge tests ensures the effectiveness of the charging system, the ability to handle high discharge rates and compares the battery capacity at that time with the rated capacity.

ELECTRICAL POWER SYSTEMS

BASES

A.C. SOURCES, D.C. SOURCES AND ONSITE POWER DISTRIBUTION SYSTEMS (Continued)

Table 4.8-2 specifies the normal limits for each designated pilot cell and each connected cell for electrolyte level, float voltage and specific gravity. The limits for the designated pilot cells float voltage and specific gravity, greater than 2.13 volts and .015 below the manufacturer's full charge specific gravity or a battery charger current that had stabilized at a low value, is characteristic of a charged cell with adequate capacity. The normal limits for each connected cell for float voltage and specific gravity, greater than 2.13 volts and not more than .020 below the manufacturer's full charge specific gravity with an average specific gravity of all the connected cells not more than .010 below the manufacturer's full charge specific gravity, ensures the OPERABILITY and capability of the battery.

Operation with a battery cell's parameter outside the normal limit but within the allowable value specified in Table 4.8-2 is permitted for up to 7 days. During this 7 day period: (1) the allowable values for electrolyte level ensures no physical damage to the plates with an adequate electron transfer capability; (2) the allowable value for the average specific gravity of all the cells, not more than .020 below the manufacturer's recommended full charge specific gravity, ensures that the decrease in rating will be less than the safety margin provided in sizing; (3) the allowable value for an individual cell's specific gravity, ensures that an individual cell's specific gravity will not be more than .040 below the manufacturer's full charge specific gravity and that the overall capability of the battery will be maintained within an acceptable limit, and (4) the allowable value for an individual cell's float voltage, greater than 2.07 volts, ensures the battery's capability to perform its design function.

3/4.8.4 ELECTRICAL EQUIPMENT PROTECTIVE DEVICES

Containment electrical penetrations and penetration conductors are protected by either deenergizing circuits not required during reactor operation or by demonstrating the OPERABILITY of primary and backup overcurrent protection circuit breakers during periodic surveillance.

The surveillance requirements applicable to lower voltage circuit breakers provide assurance of breaker reliability by testing at least one representative sample of each manufacturer's brand of circuit breaker. Each manufacturer's molded case and metal case circuit breakers are grouped into representative samples which are then tested on a rotating basis to ensure that all breakers are tested. If a wide variety exists within any manufacturer's brand of circuit breakers, it is necessary to divide that manufacturer's breakers into groups and treat each group as a separate type of breaker for surveillance purposes.

The surveillance requirements of the circuit breakers for non-Class 1E cables located in trays which do not have cable tray covers and which provide protection for cables that, if faulted, could cause failure in both adjacent, redundant Class 1E cables ensures that the integrity of Class 1E cables is not compromised by the failure of protection devices to operate in the non-Class 1E cables.

ATTACHMENT II

LIST OF REGULATORY COMMITMENTS

There are no regulatory commitments created due to this License Amendment Request. The proposed changes provide literal compliance with existing regulatory requirements.