SOUTHERN CALIFORNIA
EDISON
An EDISON INTERNATIONAL℠ Company

Dwight E. Nunn
Vice President

April 6, 2001

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

Gentlemen:

Subject: **Docket Nos. 50-361 and 50-362**
Diesel Generator Surveillance Testing
Amendment Application Numbers 208 and 193
Change to Technical Specification Section 3.8
"ELECTRICAL POWER SYSTEMS"
San Onofre Nuclear Generating Station Units 2 and 3

Enclosed are Amendment Application Number 208 to Facility Operating License NPF-10, and Amendment Application Number 193 to Facility Operating License NPF-15, for the San Onofre Nuclear Generating Station, Units 2 and 3, respectively. The Amendment Applications consist of Proposed Technical Specification Change Number (PCN)-525 which is provided in Enclosure 1 to this letter.

PCN-525 is a request to revise Technical Specification (TS) 3.8.1, "AC Sources - Operating." This TS change request is to add annotations to Surveillance Requirements 3.8.1.2, 3.8.1.3, 3.8.1.9, 3.8.1.10 and 3.8.1.19 that provide guidance to ensure a diesel generator sub-component, an automatic voltage regulator (AVR), is operable and regularly tested. Each of the San Onofre Nuclear Generating Station (SONGS) diesel generators has 2 AVRs that are 100% redundant to each other. Only one AVR is required for the associated diesel generator to be operable and only one AVR can be in service at any one time. For an AVR to be placed into service and be considered OPERABLE it will be required to have undergone testing per Surveillance Requirements 3.8.1.2 or 3.8.1.7 and 3.8.1.3 within the last two months, and also have undergone either Surveillance Requirement 3.8.1.9, 3.8.1.10, or 3.8.1.19 within the last 24 months. A description of the AVR surveillance requirements and their affects on both AVR and diesel generator operability is being added to the TS Bases for each of the five SRs. The proposed revision to the TS Bases is included in Enclosure 1 for your information. This change is being requested because, without it, it can be postulated that both AVRs are required to be in service during performance of all of the diesel generator Surveillance

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Requirements. This would necessitate that all surveillances be performed two times, thereby causing excessive wear on the diesel generator without providing a commensurate increase in assuring both AVRs will perform their design function.

The Southern California Edison Company (SCE) requests these amendments be issued by July 1, 2001, and be effective 30 days after issuance. The reason for this date is to avoid taking Unit 2 off-line to perform the 24 month surveillances on the AVRs.

If you would like additional information regarding this Proposed Technical Specification Change, please call Jack Rainsberry at (949) 368-7420.

Sincerely,

Enclosure

cc: E. W. Merschoff, Regional Administrator, NRC Region IV
J. A. Sloan, NRC Senior Resident Inspector, San Onofre Units 2 & 3
L. Raghavan, NRC Project Manager, San Onofre Units 1, 2, and 3
S. Y. Hsu, Department of Health Services, Radiologic Health Branch

ENCLOSURE 1

AMENDMENT APPLICATIONS

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

Application of SOUTHERN CALIFORNIA EDISON COMPANY, ET AL. for a Class 103 License to Acquire, Possess, and Use a Utilization Facility as Part of Unit No. 2 of the San Onofre Nuclear Generating Station	))))))	Docket No. 50-361 Amendment Application No. 208

SOUTHERN CALIFORNIA EDISON COMPANY, ET AL. pursuant to 10 CFR 50.90, hereby submit Amendment Application No. 208. This amendment application consists of Proposed Technical Specification Change Number 525 to Facility Operating License NPF-10.

Proposed Technical Specification Change No. 525 is a request to revise Technical Specification (TS) 3.8.1, "AC Sources - Operating." This TS change request is to add annotations to Surveillance Requirements 3.8.1.2, 3.8.1.3, 3.8.1.9, 3.8.1.10, and 3.8.1.19 that provide guidance to ensure a diesel generator sub-component, an automatic voltage regulator (AVR), is operable and regularly tested. For an AVR to be considered OPERABLE it will be required to have undergone testing per Surveillance Requirements 3.8.1.2 or 3.8.1.7 and 3.8.1.3 within the last two months, and also have undergone either Surveillance Requirement 3.8.1.9, 3.8.1.10, or 3.8.1.19 within the last 24 months.

Subscribed on this 6th day of April, 2001.

Respectfully submitted,

SOUTHERN CALIFORNIA EDISON COMPANY

By: _____
Dwight E. Nunn
Vice President
Engineering & Technical Services

State of California
County of San Diego
On April 6, 2001, before me, Mariane Sanchez,
personally appeared Dwight E. Nunn, personally known
to me to be the person whose name is subscribed to the within instrument and acknowledged
to me that he executed the same in his authorized capacity, and that by his signature on the
instrument the person, or the entity upon behalf of which the person acted, executed the instrument.

WITNESS my hand and official seal.

Signature _____

MARIANE SANCHEZ
Commission #1196482
Notary Public - California
San Diego County
My Comm. Expires Oct 14, 2002

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

Application of SOUTHERN CALIFORNIA EDISON COMPANY, ET AL. for a Class 103 License to Acquire, Possess, and Use a Utilization Facility as Part of Unit No. 3 of the San Onofre Nuclear Generating Station	))))))	Docket No. 50-362 Amendment Application No. 193

SOUTHERN CALIFORNIA EDISON COMPANY, ET AL. pursuant to 10 CFR 50.90, hereby submit Amendment Application No. 193. This amendment application consists of Proposed Technical Specification Change No. 525 to Facility Operating License NPF-15.

Proposed Technical Specification Change No. 525 is a request to revise Technical Specification (TS) 3.8.1, "AC Sources - Operating." This TS change request is to add annotations to Surveillance Requirements 3.8.1.2, 3.8.1.3, 3.8.1.9, 3.8.1.10, and 3.8.1.19 that provide guidance to ensure a diesel generator sub-component, an automatic voltage regulator (AVR), is operable and regularly tested. For an AVR to be considered OPERABLE it will be required to have undergone testing per Surveillance Requirements 3.8.1.2 or 3.8.1.7 and 3.8.1.3 within the last two months, and also have undergone either Surveillance Requirement 3.8.1.9, 3.8.1.10, or 3.8.1.19 within the last 24 months.

Subscribed on this 6th day of April, 2001.

Respectfully submitted,

SOUTHERN CALIFORNIA EDISON COMPANY

By: _____
Dwight E. Nunn
Vice President
Engineering & Technical Services

State of California
County of San Diego
On April 6, 2001, before me, Mariane Sanchez,
personally appeared DWIGHT E. NUNN, personally known
to me to be the person whose name is subscribed to the within instrument and acknowledged
to me that he executed the same in his authorized capacity, and that by his signature on the
instrument the person, or the entity upon behalf of which the person acted, executed the instrument.

WITNESS my hand and official seal.

Signature _____

MARIANE SANCHEZ
Commission #1196482
Notary Public - California
San Diego County
My Comm. Expires Oct 14, 2002

DESCRIPTION OF SAFETY ANALYSIS OF PROPOSED CHANGE NPF-10/15-525

This is a request to revise Technical Specification (TS) 3.8.1, "AC Sources - Operating." This TS change request is to add annotations to Surveillance Requirements 3.8.1.2, 3.8.1.3, 3.8.1.9, and 3.8.1.10 that provide guidance to ensure a diesel generator (DG) sub-component, an automatic voltage regulator (AVR), is capable of performing its design function.

Existing Technical Specifications Pages:

Unit 2: See Attachment A

Unit 3: See Attachment B

Proposed Technical Specifications Pages: (Redline and Strikeout)

Unit 2: See Attachment C

Unit 3: See Attachment D

Proposed Technical Specifications Pages:

Unit 2: See Attachment E

Unit 3: See Attachment F

Proposed Bases Pages (for information only):

Unit 2: See Attachment G

Unit 3: See Attachment H

Description of Change:

Add the following note to Surveillance Requirements (SRs) 3.8.1.2 and 3.8.1.3

- To ensure Operability of an AVR, it must have been aligned to the DG during the performance of SR 3.8.1.2 or SR 3.8.1.7 and SR 3.8.1.3 within the last 60 days, plus any allowance per SR 3.0.2.

Add the following Note to Surveillance Requirements SR 3.8.1.9, and SR 3.8.1.10, and SR 3.8.1.19.

- To ensure Operability of an AVR, it must have been aligned to the DG during the performance of either SR 3.8.1.9, SR 3.8.1.10, or SR 3.8.1.19 within the last 24 months, plus any allowance per SR 3.0.2.

Discussion:

System Description

The generators for Emergency Diesel Generators (EDG) 2G002, 2G003, 3G002, and 3G003, provided by Ideal Electric, convert the mechanical power produced by the diesel engines to electrical power to supply the Class 1E Engineered Safety Feature (ESF) Loads (and some non-Class 1E loads tripped by Safety Injection Actuation Signal (SIAS)) following a loss of offsite power (LOOP).

The horizontal, synchronous generators are 4.36 kV, 3 Phase, AC, 60 Hz, 8 pole generators and operate at 900 rpm. They are rated at 4700 KW at a 0.8 power factor. Each EDG has a horizontal, brushless exciter rated at 50 kW, 250V, 200 amps, and operates at 900 rpm. Each EDG is equipped with a Basler Electric dual automatic voltage regulator (AVR) with motor operated potentiometer (MOP) rheostat control.

The generator output voltage is controlled by the diesel generator excitation system consisting of a brushless exciter and one of two 100% capacity voltage regulators. The generator voltage output is determined by the field strength, which is determined by the exciter output controlled by one of the redundant voltage regulators. The voltage regulator controls the generator output voltage by controlling the field of the exciter. Should a failure of the in-service voltage regulator occur, the diesel generator is shutdown or placed in idle mode and the second voltage regulator is placed in service. The excitation system regulates the output voltage to the selected voltage at the generator terminals.

The inservice voltage regulator senses generator output voltage and compares this voltage to a reference voltage. The voltage regulator regulates the exciter field to maintain a set ratio between the reference and sensed voltages. After the diesel generator is running, the operator can adjust the reference voltage, and thus the generator output voltage, by voltage regulator "RAISE/LOWER" pushbuttons in the Control Room (when the diesel generator control is in the remote mode) or at the local diesel generator control panel (when the diesel generator control is in the local mode). The reference voltage is automatically reset when the diesel generator is shutdown or upon receipt of a Loss of Voltage Signal (LOVS) or Safety Injection Actuation Signal (SIAS).

The AC output of the exciter is converted to DC by a shaft mounted rectifier bank prior to being applied to the generator's rotating field. Initial field flashing is applied to the exciter on a diesel generator start 1.5 seconds after the diesel generator speed reaches 150 rpm. Field flashing is applied by the respective class 1E 125 Volt batteries associated with the diesel generator. The exciter power sources to the static voltage regulators are removed when the diesel generators are in idle speed.

Background

Each emergency diesel generator (EDG) has 2 AVRs that are 100% redundant to each other, and each AVR is aligned to its EDG on alternating months. Consequently, during the 1-month, 6-month and 24-month EDG surveillance testing, only one AVR undergoes the test (i.e., whichever AVR happens to be aligned to the EDG when the test is performed). In 1999, SCE evaluated whether this practice complies with the technical specification (TS) requirements for EDG surveillance testing, since an EDG is often aligned to an AVR which has not undergone the most recent 6-month or 24-month surveillance test. SCE concluded that the AVR was a subcomponent of the EDG and determined an AVR which had previously passed a 24-month surveillance test and was tested bimonthly was considered capable of performing its intended function.

In February of 2001, after observing a recently performed EDG surveillance test, an NRC resident inspector raised the question of the adequacy of the EDG surveillance testing. At this time, the NRC concluded the AVR is an integral part of the EDG, and therefore, each AVR requires the same level of testing as the EDG in order to comply with the TS. The NRC residents indicated that they do not consider this to be a safety significant issue; however, this is considered a TS compliance issue.

Following the February NRC Exit meeting, SONGS determined that the EDG surveillances were not conducted in literal compliance with the technical specification surveillance test requirements. For an AVR to be considered OPERABLE all of the EDG surveillance requirements must be performed with that AVR in service. Subsequently, technical specification compliance was established by selecting an AVR which had been tested and/or by completing the required surveillance testing.

Proposed Technical Specification Change:

To resolve this AVR issue in a manner that will ensure the AVRs are properly functioning, maintain both AVRs in an OPERABLE status, and minimize the required number of times the EDG is run for testing, the Southern California Edison Company (SCE) is submitting this amendment application.

SONGS Technical Specification 3.8.1 applies to the diesel generator systems. Requirements for testing of individual components of the DG systems are not specifically identified. Of the twenty separate surveillance requirements, thirteen impose a requirement on the diesel generator voltage.

There are four basic features that an AVR must be capable of performing.

1. Maintain voltage under no load (minimum field current).
2. Maintain voltage under full diesel generator load (corresponding field current).
3. Operate in parallel with offsite power source.
4. Respond dynamically under transient conditions.

Testing that validates all of these performance features will provide a high level of assurance that the AVR will perform its intended function when required. Testing to satisfy surveillance requirements 3.8.1.2 or 3.8.1.7 and 3.8.1.3 are performed on a monthly basis. These two surveillances test the selected AVR at no load, full diesel generator load, and in parallel operation with the offsite power source. While all of the surveillance requirements provide some level of validation of dynamic AVR performance, Surveillance Requirements 3.8.1.9, 3.8.1.10, and 3.8.1.19 are the surveillance requirements which challenge the dynamic response of the AVR the most. Table 1 summarizes the technical specifications affecting the diesel AVRs with respect to the four basic performance features.

Table 1
Diesel Technical Specifications That
Apply to Automatic Voltage Regulators

T/S 3.8.1.x	Test	Frequency	Load	AVR Feature(s) Tested
2	Start	Monthly	None	(1)
3	Parallel	Monthly	Full*	(2) (3)
7	Start	Semi annual	None	(1)
9	Largest load reject	24 months	Partial	(1) (4)
10	Full load reject	24 months	Full*	(1) (2) (3) (4)
11	Start	24 months	Partial	(1)
12	SIAS start	24 months	None	(1)
14	Parallel operation	24 months	Full*	(2) (3)
15	Restart	24 months	None	(1)
16	Parallel	24 months	Partial	(3)
17	SIAS start in parallel w/offsite power	24 months	Partial	(1) (3)
19	LOOP +ESF start	24 months	Partial	(1) (4)
20	2 diesel start	10 years	None	(1)

*Full diesel generator load is greater than 4450 KW

From this table, it can be seen that many of the 24 month surveillance tests are repetitious with respect to AVR performance.

Change Justification

This technical specification change request proposes two changes to the SONGS diesel surveillance requirements

1. Adds a note to SR 3.8.1.2 and SR 3.8.1.3 to allow staggered testing of the AVRs. This will check that the AVR can regulate at no load, full diesel generator load, and will operate in parallel with an offsite power source. The basis for this change request is that the AVRs are reliable devices as demonstrated by the design and maintenance history.

2. Adds a note to SR 3.8.1.9, SR 3.8.1.10, and SR 3.8.1.19 to require that each AVR be tested during diesel testing for either SR 3.8.1.9, SR 3.8.1.10 or SR 3.8.1.19. For example, we would select AVR A during the performance of SR 3.8.1.9 and AVR B during the performance of SR 3.8.1.10. Each AVR would have to be tested every 24 months under either SR 3.8.1.9, SR 3.8.1.10, or SR 3.8.1.19, but would not be required to be tested under more than one of these surveillance requirements.

The monthly diesel testing has been effective in identifying problems with the AVRs. It is expected that most AVR problems will be revealed during the monthly testing. The dynamic response of the AVR can be validated with any of the three specified 24 month tests. The basis for this change request is that (1) the bimonthly test of an AVR is effective in identifying AVR problems, (2) The 24 month tests provide additional assurance of proper operation under dynamic conditions, and (3) additional testing above this would add unnecessary wear on the diesel generator.

AVR Design:

The AVR is a static regulator utilizing primarily solid state electronic components. Each AVR only has 4 moving parts: two adjustment potentiometers, a slidewire resistor in the droop circuit, and a permissive relay which prevents AVR action until the generator reaches 75% voltage via field flashing and self-excitation. These four components function during the monthly testing, and degradation would likely be revealed during testing.

Normal aging failures for solid state electrical components are related to long term thermal affects produced by power dissipation when the device is energized. When the DG is not operating, the AVRs are completely de-energized, so there is no power dissipation taking place. Since each DG operates only a small percentage of the time, failure of solid state components from normal aging mechanisms is very unlikely. Additionally, all of the solid state electronic components perform active functions during the monthly load testing and any degradation would likely be revealed during that time.

Staggered Monthly AVR Testing:

During the monthly diesel generator testing, the selected AVR is operated from no load conditions to full diesel generator load conditions in parallel with offsite power.

The AVRs are static voltage regulators that require no moving parts to accomplish the regulation itself when not operated in parallel. There are two adjustment potentiometers in the AVR, one for voltage range and one for stability. The vendor manual states, "these adjustments are made during initial operation and normally do not have to be repeated during the life of the regulator." The vendor manual further states that "due to its rugged construction, the regulator can be mounted directly on the generator," however, in the SONGS design, the regulators are mounted in a control panel away from the generator itself, which provides an added level of reliability. The vendor statements are corroborated by experience at SONGS. The regulators were initially installed more than 15 years ago, and no readjustments have been required to pass any of the surveillance tests. Based on this, it is concluded that component drift is not a concern for these devices.

SONGS Diesel Generators AVR History Since 1990:

The AVR maintenance history since 1990 of the SONGS Units 2 and 3 diesel generator was reviewed for corrective action taken since 1990. Fourteen problems were noted where corrective actions on an AVR were taken. Table 2 summarizes the results of that review. The problems that required corrective actions can be grouped in three categories, motor operated potentiometer (MOP) problems, personnel errors during maintenance, and other AVR component problems.

It is estimated that over 500 surveillance tests have been conducted on the SONGS 2 and 3 diesel generators since 1990 that checked for proper operation of an associated AVR. During this time frame, corrective maintenance was required on an AVR on 14 occasions. Motor operated potentiometer degradation accounted for 10 events which were corrected by performing routine preventative maintenance. Personnel error accounted for 2 events. The remaining 2 events involved components within the AVR circuits. Of these 14 events, thirteen either were detected, or would have been detected, during the monthly surveillance testing. One event would not have been detected by the monthly surveillance test, however, it did not impact the functional capability of the AVR.

The 10 MOP events, which were corrected by performing routine preventative maintenance, represent about 2% of the surveillances performed over the 10 year period. Also, these events were discovered when adjusting the MOP during parallel operation. Primarily, the diesel generator is run in parallel operation to support testing and the MOP is only adjusted during parallel operation.

Based on the above discussion, the AVRs have proven to be reliable components. In addition, functional problems that have developed are readily detected during the monthly surveillance testing. Most of the functional problems that did occur were related to controlling the Volt Amps Reactive (VARs) during parallel operations rather than a complete failure to operate. Therefore, the proposed surveillance requirements are adequate to reveal expected problems with AVR operation.

Diesel Generators AVR Failure History
Since 1990
Table 2

Diesel	AVR	Date	Symptom	Action	Detected by monthly?
2G002	A	01/1999	During maintenance functional testing, blew a fuse	Replaced fuse and diodes for MOP	Maintenance error damaged these items during PM. Detectable on monthly runs.
	A	06/2000	During maintenance testing, MOP would not return home and diodes were discovered blown.	Replaced diodes in MOP	Maintenance testing error damaged MOP components. Detectable on monthly runs.

Diesel Generators AVR Failure History
Since 1990
Table 2
(Continued)

Diesel	AVR	Date	Symptom	Action	Detected by monthly?
	B	01/1997	Variation in VARs during parallel operation	Performed Preventive Maintenance (PM) to clean and inspect MOP setting	Yes
	B	10/1998	Variation in VARs during parallel operation	Performed PM to clean and inspect MOP setting	Yes
	B	11/1998	Maintenance personnel determined MOP had a dirty contact as result of monthly run	Performed PM to clean and inspect MOP setting	Yes
	B	10/2000	Variation in VARs during parallel operation	Performed PM to clean and inspect MOP setting	Yes
2G003	B	03/1990	Generated Maintenance Order (MO) at request of engineering	Cleaned, adjusted, and inspected MOP	Yes
	B	04/1990	Variation in VARs during parallel operation	Performed PM to clean and inspect MOP setting	Yes
	B	05/1991	Generator tripped while adjusting VARs during monthly diesel operation	Replaced MOP pot	Yes
3G002	A	01/1998	Variation in VARs during parallel operation	Performed PM to clean and inspect MOP setting	Yes
	A	07/2000	Sudden rapid rise in VARs during diesel monthly run	Replaced MOP	Yes
3G003	A	07/1996	Variation in VARs during monthly run	Replaced AVR A due to water intrusion	Yes
	B	08/1998	During inspection for water intrusion, found blown capacitor (no evidence of water intrusion)	Replaced AVR B due to blown capacitor	No There is no functional impact from capacitor failure so not detectable under any tests.

Diesel Generators AVR Failure History
Since 1990
Table 2
(Continued)

Diesel	AVR	Date	Symptom	Action	Detected by monthly?
	B	12/1998	Constant manual adjustment required to maintain VARs in range during monthly run	Replaced AVR B due to bad range adjustment pot (manufacturing defect).	Yes

Six Month and Longer Surveillance Testing:

There are eleven diesel surveillance tests (with a frequency of 6 months or longer) which have acceptance criteria on the diesel output voltage. The monthly diesel testing checks the no load, full diesel generator load, and parallel operation of the AVR, and, in a limited fashion, checks the dynamic response of the selected AVR. The 24 month load reject, single largest load reject, and load sequencing tests subject the AVR to larger dynamic transients than any of the other surveillance testing. These tests, therefore, provide assurance of proper dynamic operation of the AVRs. The six month surveillance test and the other 24 month and ten year tests do not provide any validation of AVR performance above that demonstrated by the three 24 month tests and the monthly test.

Therefore, conducting at least one test of dynamic operation on each AVR at 24 month intervals in conjunction with the proposed 60 day testing interval provides sufficient information regarding the ability of the AVR to perform its design function. The additional wear on the diesel generator that would result by running all surveillances twice, once for each AVR, is not justified by any additional information or assurances that would be gained.

Summary:

The diesel generators provide emergency power to accident mitigation equipment in the event of a loss of offsite power. The SONGS diesels each have two AVRs that are redundant to each other. Only one of the two AVRs can be in service at a time. Maintaining both AVRs for each diesel in a high state of readiness while minimizing unnecessary testing on the diesels optimizes the overall availability of the diesel generator systems to perform their function if required.

This change allows testing the two AVRs for each diesel on a staggered monthly basis. The monthly testing of the EDG (bimonthly of each AVR) validates that the AVR is capable of regulating the diesel voltage under no load, full diesel generator load, and while operating in parallel with an offsite power source. The experience at SONGS has been that this test will reveal essentially all significant problems with AVR performance. In addition, this change clarifies that each AVR only needs to be subjected to a dynamically challenging test once every 24 months provided that its dynamic performance is measured and determined to be acceptable. These testing requirements provide a high level of assurance that each AVR will be capable of performing its design function while minimizing unnecessary wear on the diesels.

References

DBD-SO23-750, Revision 1, Emergency Diesel Generators Design Basis Document

No Significant Hazards Considerations:

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for facility involves no significant hazards consideration if operation of the facility in accordance with a proposed amendment would not: (1) involve a significant increase in the probability or consequences of an accident previously evaluated; or (2) create the possibility of a new or different kind of accident from any accident previously evaluated; or (3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows to show that operation of the facility in accordance with this proposed amendment does not:

1. Involve a significant increase in the probability or consequences of an accident previously evaluated?

   Response: No

   The diesel generators provide emergency power to accident mitigation equipment in the event of a loss of offsite power. They cannot cause an accident. The San Onofre Nuclear Generating Station (SONGS) emergency diesel generators (EDG) each have two automatic voltage regulators (AVRs) that are 100% redundant to each other. Maintaining both AVRs for each diesel in a high state of readiness, while minimizing unnecessary testing on the diesels, optimizes the overall availability of the diesel generator systems to perform their function if required.

   This change allows testing the two AVRs for each diesel on a staggered monthly basis. In addition, it clarifies that each AVR only needs to be subjected to a dynamically challenging test once every 24 months provided that its dynamic performance is measured and determined to be acceptable. These testing requirements demonstrate a high level of assurance that each AVR will be capable of performing its design function while minimizing unnecessary wear on the diesels. The reliability of the diesel generators to provide emergency power will not be degraded as a result of this change.

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

2. Create the possibility of a new or different kind of accident from any accident previously evaluated?

   Response: No

   The AVRs are a subcomponent of the EDGs. This change to the surveillance test frequency does not physically change the use, function, or design of the EDG or its subcomponent, the AVR.

This change ensures both 100% capacity AVRs are adequately tested to ensure operability without increasing the number of test starts of the EDGs.

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

3. Involve a significant reduction in a margin of safety?

Response: No

This change allows testing the two AVRs for each diesel on a staggered monthly basis. In addition, it clarifies that each AVR only needs to be subjected to a dynamically challenging test once every 24 months provided that its dynamic performance is measured and determined to be acceptable. These testing requirements demonstrate a high level of assurance that each AVR will be capable of performing its design function while minimizing unnecessary wear on the diesels. This proposed change does not involve an alteration of the SONGS 2 and 3 design. The reliability of the diesel generators to provide emergency power will not be degraded as a result of this change.

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

Based on the responses to these three criterion, Southern California Edison (SCE) has concluded that the proposed amendment involves no significant hazards consideration.

Environmental Consideration:

SCE has determined that the proposed amendment involves no changes in the amount or type of effluent that may be released offsite, and results in no increase in individual or cumulative occupational radiation exposure. As described above, the proposed TS amendment involves no significant hazards consideration and, as such, meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9).

Attachment A

(Existing Technical Specification Pages)

SONGS Unit 2

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.2	----------NOTES---------- 1. Performance of SR 3.8.1.7 satisfies this SR. 2. All DG starts may be preceded by an engine prelube period and followed by a warmup period prior to loading. 3. A modified DG start involving idling and gradual acceleration to rated speed may be used for this SR as recommended by the manufacturer. When modified start procedures are not used, the time, voltage, and frequency tolerances of SR 3.8.1.7 must be met. ----------	
	Verify each DG starts from standby conditions and achieves: a. Steady state voltage ≥ 4297 V and ≤ 4576 V; and b. Steady state frequency ≥ 59.7 Hz and ≤ 61.2 Hz.	As specified in Table 3.8.1-1

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.3	----------NOTES---------- 1. DG loadings may include gradual loading as recommended by the manufacturer. 2. Momentary transients outside the load range do not invalidate this test. 3. This Surveillance shall be conducted on only one DG at a time. 4. This SR shall be preceded by, and immediately follow without shutdown, a successful performance of SR 3.8.1.2 or SR 3.8.1.7. ---------- Verify each DG is synchronized and loaded, and operates for ≥ 60 minutes at a load ≥ 4450 kW and ≤ 4700 kW.	As specified in Table 3.8.1-1
SR 3.8.1.4	Verify each day tank contains ≥ 30 inches of fuel oil.	31 days
SR 3.8.1.5	Check for and remove accumulated water from each day tank.	31 days
SR 3.8.1.6	Verify the fuel oil transfer system operates to transfer fuel oil from storage tank to the day tank.	31 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.9	----------NOTE---------- Credit may be taken for unplanned events that satisfy this SR. ---------- Verify each DG rejects a load greater than or equal to its associated single largest post-accident load, and: a. Following load rejection, the frequency is ≤ 66.75 Hz; b. Within 4 seconds following load rejection, the voltage is ≥ 4297 V and ≤ 4576 V; and c. Within 4 seconds following load rejection, the frequency is ≥ 59.7 Hz and ≤ 61.2 Hz.	24 months
SR 3.8.1.10	----------NOTE---------- Credit may be taken for unplanned events that satisfy this SR. ---------- Verify each DG, when connected to its bus in parallel with offsite power and operating with inductive loading that offsite power conditions permit, during and following a load rejection of ≥ 4450 kW and ≤ 4700 kW: a. Does not trip; and b. Voltage is maintained ≤ 5450 V.	24 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.19	----------NOTES---------- 1. All DG starts may be preceded by an engine prelube period. 2. Credit may be taken for unplanned events that satisfy this SR. ---------- Verify on an actual or simulated loss of offsite power signal in conjunction with actual or simulated ESF actuation signals: a. De-energization of emergency buses; b. Load shedding from emergency buses; c. DG auto-starts from standby condition and: 1. energizes permanently connected loads and resets the 4.16 kV bus undervoltage relay logic in ≤ 10 seconds; 2. energizes auto-connected emergency loads through the programmed time interval load sequence; 3. achieves steady state voltage ≥ 4297 V and ≤ 4576 V; 4. achieves steady state frequency ≥ 59.7 Hz and ≤ 61.2 Hz; and 5. supplies permanently connected and auto-connected emergency loads for ≥ 5 minutes.	24 months

(continued)

Attachment B

(Existing Technical Specification Pages)

SONGS Unit 3

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.2	----------NOTES---------- 1. Performance of SR 3.8.1.7 satisfies this SR. 2. All DG starts may be preceded by an engine prelube period and followed by a warmup period prior to loading. 3. A modified DG start involving idling and gradual acceleration to rated speed may be used for this SR as recommended by the manufacturer. When modified start procedures are not used, the time, voltage, and frequency tolerances of SR 3.8.1.7 must be met. ----------	
	Verify each DG starts from standby conditions and achieves:	As specified in Table 3.8.1-1
	a. Steady state voltage ≥ 4297 V and ≤ 4576 V; and	
	b. Steady state frequency ≥ 59.7 Hz and ≤ 61.2 Hz.	

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.3	----------NOTES---------- 1. DG loadings may include gradual loading as recommended by the manufacturer. 2. Momentary transients outside the load range do not invalidate this test. 3. This Surveillance shall be conducted on only one DG at a time. 4. This SR shall be preceded by, and immediately follow without shutdown, a successful performance of SR 3.8.1.2 or SR 3.8.1.7. ---------- Verify each DG is synchronized and loaded, and operates for ≥ 60 minutes at a load ≥ 4450 kW and ≤ 4700 kW.	As specified in Table 3.8.1-1
SR 3.8.1.4	Verify each day tank contains ≥ 30 inches of fuel oil.	31 days
SR 3.8.1.5	Check for and remove accumulated water from each day tank.	31 days
SR 3.8.1.6	Verify the fuel oil transfer system operates to transfer fuel oil from storage tank to the day tank.	31 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.9	----------NOTE---------- Credit may be taken for unplanned events that satisfy this SR. ---------- Verify each DG rejects a load greater than or equal to its associated single largest post-accident load, and: a. Following load rejection, the frequency is ≤ 66.75 Hz; b. Within 4 seconds following load rejection, the voltage is ≥ 4297 V and ≤ 4576 V; and c. Within 4 seconds following load rejection, the frequency is ≥ 59.7 Hz and ≤ 61.2 Hz.	24 months
SR 3.8.1.10	----------NOTE---------- Credit may be taken for unplanned events that satisfy this SR. ---------- Verify each DG, when connected to its bus in parallel with offsite power and operating with inductive loading that offsite power conditions permit, during and following a load rejection of ≥ 4450 kW and ≤ 4700 kW: a. Does not trip; and b. Voltage is maintained ≤ 5450 V.	24 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.19	----------NOTES---------- 1. All DG starts may be preceded by an engine prelube period. 2. Credit may be taken for unplanned events that satisfy this SR. ---------- Verify on an actual or simulated loss of offsite power signal in conjunction with actual or simulated ESF actuation signals: a. De-energization of emergency buses; b. Load shedding from emergency buses; c. DG auto-starts from standby condition and: 1. energizes permanently connected loads and resets the 4.16 kV bus undervoltage relay logic in ≤ 10 seconds; 2. energizes auto-connected emergency loads through the programmed time interval load sequence; 3. achieves steady state voltage ≥ 4297 V and ≤ 4576 V; 4. achieves steady state frequency ≥ 59.7 Hz and ≤ 61.2 Hz; and 5. supplies permanently connected and auto-connected emergency loads for ≥ 5 minutes.	24 months

(continued)

Attachment C

(Proposed Technical Specification Pages)

(Redline and Strikeout)

SONGS Unit 2

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.2	----------NOTES---------- 1. Performance of SR 3.8.1.7 satisfies this SR. 2. All DG starts may be preceded by an engine prelube period and followed by a warmup period prior to loading. 3. A modified DG start involving idling and gradual acceleration to rated speed may be used for this SR as recommended by the manufacturer. When modified start procedures are not used, the time, voltage, and frequency tolerances of SR 3.8.1.7 must be met. 4. To ensure Operability of an AVR, it must have been aligned to the DG during the performance of SR 3.8.1.2 or SR 3.8.1.7 and SR 3.8.1.3 within the last 60 days, plus any allowance per SR 3.0.2. ---------- Verify each DG starts from standby conditions and achieves: a. Steady state voltage ≥ 4297 V and ≤ 4576 V; and b. Steady state frequency ≥ 59.7 Hz and ≤ 61.2 Hz.	As specified in Table 3.8.1-1

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.3	----------NOTES---------- 1. DG loadings may include gradual loading as recommended by the manufacturer. 2. Momentary transients outside the load range do not invalidate this test. 3. This Surveillance shall be conducted on only one DG at a time. 4. This SR shall be preceded by, and immediately follow without shutdown, a successful performance of SR 3.8.1.2 or SR 3.8.1.7. 5. To ensure Operability of an AVR, it must have been aligned to the DG during the performance of SR 3.8.1.2 or SR 3.8.1.7 and SR 3.8.1.3 within the last 60 days, plus any allowance per SR 3.0.2. ---------- Verify each DG is synchronized and loaded, and operates for ≥ 60 minutes at a load ≥ 4450 kW and ≤ 4700 kW.	As specified in Table 3.8.1-1
SR 3.8.1.4	Verify each day tank contains ≥ 30 inches of fuel oil.	31 days
SR 3.8.1.5	Check for and remove accumulated water from each day tank.	31 days
SR 3.8.1.6	Verify the fuel oil transfer system operates to transfer fuel oil from storage tank to the day tank.	31 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.9	----------NOTE---------- 1. Credit may be taken for unplanned events that satisfy this SR. 2. To ensure Operability of an AVR, it must have been aligned to the DG during the performance of either SR 3.8.1.9, SR 3.8.1.10, or SR 3.8.1.19 within the last 24 months, plus any allowance per SR 3.0.2. ---------- Verify each DG rejects a load greater than or equal to its associated single largest post-accident load, and: a. Following load rejection, the frequency is ≤ 66.75 Hz; b. Within 4 seconds following load rejection, the voltage is ≥ 4297 V and ≤ 4576 V; and c. Within 4 seconds following load rejection, the frequency is ≥ 59.7 Hz and ≤ 61.2 Hz.	24 months
SR 3.8.1.10	----------NOTE---------- 1. Credit may be taken for unplanned events that satisfy this SR. 2. To ensure Operability of an AVR, it must have been aligned to the DG during the performance of either SR 3.8.1.9, SR 3.8.1.10, or SR 3.8.1.19 within the last 24 months, plus any allowance per SR 3.0.2. ---------- Verify each DG, when connected to its bus in parallel with offsite power and operating with inductive loading that offsite power conditions permit, during and following a load rejection of ≥ 4450 kW and ≤ 4700 kW: a. Does not trip; and b. Voltage is maintained ≤ 5450 V.	24 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.19	----------NOTES---------- 1. All DG starts may be preceded by an engine prelube period. 2. Credit may be taken for unplanned events that satisfy this SR. 3. To ensure Operability of an AVR, it must have been aligned to the DG during the performance of either SR 3.8.1.9, SR 3.8.1.10, or SR 3.8.1.19 within the last 24 months, plus any allowance per SR 3.0.2. ---------- Verify on an actual or simulated loss of offsite power signal in conjunction with actual or simulated ESF actuation signals: a. De-energization of emergency buses; b. Load shedding from emergency buses; c. DG auto-starts from standby condition and: 1. energizes permanently connected loads and resets the 4.16 kV bus undervoltage relay logic in ≤ 10 seconds; 2. energizes auto-connected emergency loads through the programmed time interval load sequence; 3. achieves steady state voltage ≥ 4297 V and ≤ 4576 V; 4. achieves steady state frequency ≥ 59.7 Hz and ≤ 61.2 Hz; and 5. supplies permanently connected and auto-connected emergency loads for ≥ 5 minutes.	24 months

(continued)

Attachment D

(Proposed Technical Specification Pages)

(Redline and Strikeout)

SONGS Unit 3

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.2	----------NOTES---------- 1. Performance of SR 3.8.1.7 satisfies this SR. 2. All DG starts may be preceded by an engine prelube period and followed by a warmup period prior to loading. 3. A modified DG start involving idling and gradual acceleration to rated speed may be used for this SR as recommended by the manufacturer. When modified start procedures are not used, the time, voltage, and frequency tolerances of SR 3.8.1.7 must be met. 4. To ensure Operability of an AVR, it must have been aligned to the DG during the performance of SR 3.8.1.2 or SR 3.8.1.7 and SR 3.8.1.3 within the last 60 days, plus any allowance per SR 3.0.2. ---------- Verify each DG starts from standby conditions and achieves: a. Steady state voltage ≥ 4297 V and ≤ 4576 V; and b. Steady state frequency ≥ 59.7 Hz and ≤ 61.2 Hz.	As specified in Table 3.8.1-1

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.3	----------NOTES---------- 1. DG loadings may include gradual loading as recommended by the manufacturer. 2. Momentary transients outside the load range do not invalidate this test. 3. This Surveillance shall be conducted on only one DG at a time. 4. This SR shall be preceded by, and immediately follow without shutdown, a successful performance of SR 3.8.1.2 or SR 3.8.1.7. 5. To ensure Operability of an AVR, it must have been aligned to the DG during the performance of SR 3.8.1.2 or SR 3.8.1.7 and SR 3.8.1.3 within the last 60 days, plus any allowance per SR 3.0.2. ---------- Verify each DG is synchronized and loaded, and operates for ≥ 60 minutes at a load ≥ 4450 kW and ≤ 4700 kW.	As specified in Table 3.8.1-1
SR 3.8.1.4	Verify each day tank contains ≥ 30 inches of fuel oil.	31 days
SR 3.8.1.5	Check for and remove accumulated water from each day tank.	31 days
SR 3.8.1.6	Verify the fuel oil transfer system operates to transfer fuel oil from storage tank to the day tank.	31 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.9	----------NOTE---------- 1. Credit may be taken for unplanned events that satisfy this SR. 2. To ensure Operability of an AVR, it must have been aligned to the DG during the performance of either SR 3.8.1.9, SR 3.8.1.10, or SR 3.8.1.19 within the last 24 months, plus any allowance per SR 3.0.2. ---------- Verify each DG rejects a load greater than or equal to its associated single largest post-accident load, and: a. Following load rejection, the frequency is ≤ 66.75 Hz; b. Within 4 seconds following load rejection, the voltage is ≥ 4297 V and ≤ 4576 V; and c. Within 4 seconds following load rejection, the frequency is ≥ 59.7 Hz and ≤ 61.2 Hz.	24 months
SR 3.8.1.10	----------NOTE---------- 1. Credit may be taken for unplanned events that satisfy this SR. 2. To ensure Operability of an AVR, it must have been aligned to the DG during the performance of either SR 3.8.1.9, SR 3.8.1.10, or SR 3.8.1.19 within the last 24 months, plus any allowance per SR 3.0.2. ---------- Verify each DG, when connected to its bus in parallel with offsite power and operating with inductive loading that offsite power conditions permit, during and following a load rejection of ≥ 4450 kW and ≤ 4700 kW: a. Does not trip; and b. Voltage is maintained ≤ 5450 V.	24 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.19	----------NOTES---------- 1. All DG starts may be preceded by an engine prelube period. 2. Credit may be taken for unplanned events that satisfy this SR. 3. To ensure Operability of an AVR, it must have been aligned to the DG during the performance of either SR 3.8.1.9, SR 3.8.1.10, or SR 3.8.1.19 within the last 24 months, plus any allowance per SR 3.0.2. ---------- Verify on an actual or simulated loss of offsite power signal in conjunction with actual or simulated ESF actuation signals: a. De-energization of emergency buses; b. Load shedding from emergency buses; c. DG auto-starts from standby condition and: 1. energizes permanently connected loads and resets the 4.16 kV bus undervoltage relay logic in ≤ 10 seconds; 2. energizes auto-connected emergency loads through the programmed time interval load sequence; 3. achieves steady state voltage ≥ 4297 V and ≤ 4576 V; 4. achieves steady state frequency ≥ 59.7 Hz and ≤ 61.2 Hz; and 5. supplies permanently connected and auto-connected emergency loads for ≥ 5 minutes.	24 months

(continued)

Attachment E

(Proposed Technical Specification Pages)

SONGS Unit 2

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.2	----------NOTES---------- 1. Performance of SR 3.8.1.7 satisfies this SR. 2. All DG starts may be preceded by an engine prelube period and followed by a warmup period prior to loading. 3. A modified DG start involving idling and gradual acceleration to rated speed may be used for this SR as recommended by the manufacturer. When modified start procedures are not used, the time, voltage, and frequency tolerances of SR 3.8.1.7 must be met. 4. To ensure Operability of an AVR, it must have been aligned to the DG during the performance of SR 3.8.1.2 or SR 3.8.1.7 and SR 3.8.1.3 within the last 60 days, plus any allowance per SR 3.0.2. ----------	
	Verify each DG starts from standby conditions and achieves: a. Steady state voltage ≥ 4297 V and ≤ 4576 V; and b. Steady state frequency ≥ 59.7 Hz and ≤ 61.2 Hz.	As specified in Table 3.8.1-1

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.3	----------NOTES---------- 1. DG loadings may include gradual loading as recommended by the manufacturer. 2. Momentary transients outside the load range do not invalidate this test. 3. This Surveillance shall be conducted on only one DG at a time. 4. This SR shall be preceded by, and immediately follow without shutdown, a successful performance of SR 3.8.1.2 or SR 3.8.1.7. 5. To ensure Operability of an AVR, it must have been aligned to the DG during the performance of SR 3.8.1.2 or SR 3.8.1.7 and SR 3.8.1.3 within the last 60 days, plus any allowance per SR 3.0.2. ---------- Verify each DG is synchronized and loaded, and operates for ≥ 60 minutes at a load ≥ 4450 kW and ≤ 4700 kW.	As specified in Table 3.8.1-1
SR 3.8.1.4	Verify each day tank contains ≥ 30 inches of fuel oil.	31 days
SR 3.8.1.5	Check for and remove accumulated water from each day tank.	31 days
SR 3.8.1.6	Verify the fuel oil transfer system operates to transfer fuel oil from storage tank to the day tank.	31 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.9	----------NOTE---------- 1. Credit may be taken for unplanned events that satisfy this SR. 2. To ensure Operability of an AVR, it must have been aligned to the DG during the performance of either SR 3.8.1.9, SR 3.8.1.10, or SR 3.8.1.19 within the last 24 months, plus any allowance per SR 3.0.2. ---------- Verify each DG rejects a load greater than or equal to its associated single largest post-accident load, and: a. Following load rejection, the frequency is ≤ 66.75 Hz; b. Within 4 seconds following load rejection, the voltage is ≥ 4297 V and ≤ 4576 V; and c. Within 4 seconds following load rejection, the frequency is ≥ 59.7 Hz and ≤ 61.2 Hz.	24 months
SR 3.8.1.10	----------NOTE---------- 1. Credit may be taken for unplanned events that satisfy this SR. 2. To ensure Operability of an AVR, it must have been aligned to the DG during the performance of either SR 3.8.1.9, SR 3.8.1.10, or SR 3.8.1.19 within the last 24 months, plus any allowance per SR 3.0.2. ---------- Verify each DG, when connected to its bus in parallel with offsite power and operating with inductive loading that offsite power conditions permit, during and following a load rejection of ≥ 4450 kW and ≤ 4700 kW: a. Does not trip; and b. Voltage is maintained ≤ 5450 V.	24 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.19	----------NOTES---------- 1. All DG starts may be preceded by an engine prelube period. 2. Credit may be taken for unplanned events that satisfy this SR. 3. To ensure Operability of an AVR, it must have been aligned to the DG during the performance of either SR 3.8.1.9, SR 3.8.1.10, or SR 3.8.1.19 within the last 24 months, plus any allowance per SR 3.0.2. ---------- Verify on an actual or simulated loss of offsite power signal in conjunction with actual or simulated ESF actuation signals: a. De-energization of emergency buses; b. Load shedding from emergency buses; c. DG auto-starts from standby condition and: 1. energizes permanently connected loads and resets the 4.16 kV bus undervoltage relay logic in ≤ 10 seconds; 2. energizes auto-connected emergency loads through the programmed time interval load sequence; 3. achieves steady state voltage ≥ 4297 V and ≤ 4576 V; 4. achieves steady state frequency ≥ 59.7 Hz and ≤ 61.2 Hz; and 5. supplies permanently connected and auto-connected emergency loads for ≥ 5 minutes.	24 months

(continued)

Attachment F

(Proposed Technical Specification Pages)

SONGS Unit 3

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.2	----------NOTES---------- 1. Performance of SR 3.8.1.7 satisfies this SR. 2. All DG starts may be preceded by an engine prelube period and followed by a warmup period prior to loading. 3. A modified DG start involving idling and gradual acceleration to rated speed may be used for this SR as recommended by the manufacturer. When modified start procedures are not used, the time, voltage, and frequency tolerances of SR 3.8.1.7 must be met. 4. To ensure Operability of an AVR, it must have been aligned to the DG during the performance of SR 3.8.1.2 or SR 3.8.1.7 and SR 3.8.1.3 within the last 60 days, plus any allowance per SR 3.0.2. ----------	
	Verify each DG starts from standby conditions and achieves: a. Steady state voltage ≥ 4297 V and ≤ 4576 V; and b. Steady state frequency ≥ 59.7 Hz and ≤ 61.2 Hz.	As specified in Table 3.8.1-1

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.3	----------NOTES---------- 1. DG loadings may include gradual loading as recommended by the manufacturer. 2. Momentary transients outside the load range do not invalidate this test. 3. This Surveillance shall be conducted on only one DG at a time. 4. This SR shall be preceded by, and immediately follow without shutdown, a successful performance of SR 3.8.1.2 or SR 3.8.1.7. 5. To ensure Operability of an AVR, it must have been aligned to the DG during the performance of SR 3.8.1.2 or SR 3.8.1.7 and SR 3.8.1.3 within the last 60 days, plus any allowance per SR 3.0.2. ---------- Verify each DG is synchronized and loaded, and operates for ≥ 60 minutes at a load ≥ 4450 kW and ≤ 4700 kW.	As specified in Table 3.8.1-1
SR 3.8.1.4	Verify each day tank contains ≥ 30 inches of fuel oil.	31 days
SR 3.8.1.5	Check for and remove accumulated water from each day tank.	31 days
SR 3.8.1.6	Verify the fuel oil transfer system operates to transfer fuel oil from storage tank to the day tank.	31 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.9	----------NOTE---------- 1. Credit may be taken for unplanned events that satisfy this SR. 2. To ensure Operability of an AVR, it must have been aligned to the DG during the performance of either SR 3.8.1.9, SR 3.8.1.10, or SR 3.8.1.19 within the last 24 months, plus any allowance per SR 3.0.2. ---------- Verify each DG rejects a load greater than or equal to its associated single largest post-accident load, and: a. Following load rejection, the frequency is ≤ 66.75 Hz; b. Within 4 seconds following load rejection, the voltage is ≥ 4297 V and ≤ 4576 V; and c. Within 4 seconds following load rejection, the frequency is ≥ 59.7 Hz and ≤ 61.2 Hz.	24 months
SR 3.8.1.10	----------NOTE---------- 1. Credit may be taken for unplanned events that satisfy this SR. 2. To ensure Operability of an AVR, it must have been aligned to the DG during the performance of either SR 3.8.1.9, SR 3.8.1.10, or SR 3.8.1.19 within the last 24 months, plus any allowance per SR 3.0.2. ---------- Verify each DG, when connected to its bus in parallel with offsite power and operating with inductive loading that offsite power conditions permit, during and following a load rejection of ≥ 4450 kW and ≤ 4700 kW: a. Does not trip; and b. Voltage is maintained ≤ 5450 V.	24 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.19	----------NOTES---------- 1. All DG starts may be preceded by an engine prelube period. 2. Credit may be taken for unplanned events that satisfy this SR. 3. To ensure Operability of an AVR, it must have been aligned to the DG during the performance of either SR 3.8.1.9, SR 3.8.1.10, or SR 3.8.1.19 within the last 24 months, plus any allowance per SR 3.0.2. ---------- Verify on an actual or simulated loss of offsite power signal in conjunction with actual or simulated ESF actuation signals: a. De-energization of emergency buses; b. Load shedding from emergency buses; c. DG auto-starts from standby condition and: 1. energizes permanently connected loads and resets the 4.16 kV bus undervoltage relay logic in ≤ 10 seconds; 2. energizes auto-connected emergency loads through the programmed time interval load sequence; 3. achieves steady state voltage ≥ 4297 V and ≤ 4576 V; 4. achieves steady state frequency ≥ 59.7 Hz and ≤ 61.2 Hz; and 5. supplies permanently connected and auto-connected emergency loads for ≥ 5 minutes.	24 months

(continued)

Attachment G

(Proposed Bases Pages)

SONGS Unit 2

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.1.2 and SR 3.8.1.7 (continued)

The normal 31 day Frequency for SR 3.8.1.2 (see Table 3.8.1-1, "Diesel Generator Test Schedule," in the accompanying LCO) and the 184 day Frequency for SR 3.8.1.7 are consistent with Regulatory Guide 1.9 (Ref. 3). These frequencies provide adequate assurance of DG OPERABILITY, while minimizing degradation resulting from testing.
Note 4 - This note discusses operability of the diesel generator subcomponent Automatic Voltage Regulator (AVR). The AVR is an integral part of the DG, however, each DG has 2 AVRs that are 100% redundant to each other. Only one AVR may be in service at any one time. To ensure operability of each AVR, the AVR's must have been in service during the performance of SR 3.8.1.2 or SR 3.8.1.7 and SR 3.8.1.3 within the last 60 days, and each AVR must have been in service for either SR 3.8.1.9, SR 3.8.1.10 or SR 3.8.1.19 within the last 24 months. During the 24 month test dynamic performance of the AVR is measured to confirm it is acceptable for all required AVR transients. Based on the design of the AVR, its intended function, and the maintenance history, the above specified surveillance schedule will assure the AVR's are capable of performing their intended function.

SR 3.8.1.3

This Surveillance verifies that the DGs are capable of synchronizing with the offsite electrical system and accepting loads greater than or equal to the equivalent of the maximum expected accident loads listed in Reference 2. This capability is verified by performing a load test between 90 to 100% of rated load, for an interval of not less than 60 minutes, consistent with the requirements of Regulatory Guide 1.9 (Ref. 3). The lower load limit of 4450 kW is 94.7% of the DG continuous rating (4700 kW). The 94.7% limit is based on design basis loading and includes instrument uncertainty plus margin. Instrument uncertainty is not applied to the upper load limit. A minimum run time of 60 minutes is required to stabilize engine temperatures, while minimizing the time that the DG is connected to the offsite source.

Although no power factor requirements are established by this SR, the surveillance is performed with DG kVAR output that offsite power system conditions permit during testing without exceeding equipment ratings (i.e., without creating an overvoltage condition on the ESF buses, over excitation condition on the ESF buses, over excitation condition in the generator, or overloading the DG main feeder). The kVAR loading requirement during this test is met, and the equipment ratings are not exceeded, when the DG kVAR output is increased such that:

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.1.3 (continued)

a. kVAR is ≥ 3000 and ≤ 3200 or
b. the excitation current is ≥ 3.8 A and ≤ 4.0 A or
c. the ESF bus voltage is ≥ 4530 V and ≤ 4550 V or
d. DG feeder current is ≥ 730 A and ≤ 750 A

This method of establishing kVAR loading ensures that, in addition to verifying the load carrying capability (kW) of the diesel engine, the reactive power (kVAR) and voltage regulation capability of the generator is verified to the extent practicable, consistent with the recommendations of Regulatory Guide 1.9 (Ref. 3) and Information Notice 91-13 (Ref. 16).

The normal 31 day Frequency for this Surveillance (Table 3.8.1-1) is consistent with Regulatory Guide 1.9 (Ref. 3).

This SR is modified by ~~four~~ five Notes. Note 1 indicates that diesel engine runs for this Surveillance may include gradual loading, as recommended by the manufacturer, so that mechanical stress and wear on the diesel engine are minimized. Note 2 states that momentary DG load transients do not invalidate this test. Note 3 indicates that this Surveillance should be conducted on only one DG at a time in order to avoid common cause failures that might result from offsite circuit or grid perturbations. Note 4 stipulates that a successful DG start must precede this test to credit satisfactory performance. Note 5 - This note discusses operability of the diesel generator subcomponent Automatic Voltage Regulator (AVR). The AVR is an integral part of the DG, however, each DG has 2 AVRs that are 100% redundant to each other. Only one AVR may be in service at any one time. To ensure operability of each AVR, the AVR's must have been in service during the performance of SR 3.8.1.2 or SR 3.8.1.7 and SR 3.8.1.3 within the last 60 days, and each AVR must have been in service for either SR 3.8.1.9, SR 3.8.1.10, or SR 3.8.1.19 within the last 24 months. During the 24 month test dynamic performance of the AVR is measured to confirm it is acceptable for all required AVR transients. Based on the design of the AVR, its intended function, and the maintenance history, the above specified surveillance schedule will assure the AVR's are capable of performing their intended function.

SR 3.8.1.4

This SR provides verification that the level of fuel oil in the day tank is at or above the level selected to ensure adequate fuel oil for a minimum of 1 hour of DG operation at full load plus 10%. The level is expressed as an equivalent volume in inches. The 30 inch level includes instrument

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.1.4 (continued)

uncertainties and corresponds to the minimum requirement of 355.1 gallons of fuel oil.

The 31 day Frequency is adequate to assure that a sufficient supply of fuel oil is available, since low level alarms are provided and unit operators would be aware of any large uses of fuel oil during this period.

SR 3.8.1.5

Microbiological fouling is a major cause of fuel oil degradation. There are numerous microorganisms that can grow in fuel oil and cause fouling, but all must have a water environment in order to survive. Removal of water from the fuel oil day tanks once every 31 days eliminates the necessary environment for microbial survival in the day tanks. This is the most effective means of controlling microbiological fouling. In addition, it eliminates the potential for water entrainment in the fuel oil during DG operation. Water may come from any of several sources, including condensation, ground water, rain water, contaminated fuel oil, and from breakdown of the fuel oil by microorganisms. Frequent checking for and removal of accumulated water minimizes fouling and provides data regarding the watertight integrity of the fuel oil system. The Surveillance Frequencies are established by Regulatory Guide 1.137 (Ref. 10). This SR is for preventive maintenance. The presence of water does not necessarily represent failure of this SR provided the accumulated water is removed during the performance of this Surveillance.

SR 3.8.1.6

This Surveillance demonstrates that for each OPERABLE DG at least one fuel oil transfer pump operates and transfers fuel oil from its associated storage tank to its associated day tank. This is required to support continuous operation of the standby power source. This Surveillance provides assurance that at least one fuel oil transfer pump is OPERABLE, the fuel oil piping system is intact, the fuel delivery piping is not obstructed, and the controls and control systems for the fuel transfer system are OPERABLE.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.1.6 (continued)

The design of the fuel transfer system is such that one pump will operate automatically, while the other pump can be started manually. Either pump will maintain an adequate volume of fuel oil in the day tank. In such a case, a 31 day Frequency is appropriate.

SR 3.8.1.7

See SR 3.8.1.2.

SR 3.8.1.8

Verification of the capability to transfer each 4.16 kV ESF bus power supply from the normal preferred power source (offsite circuit) to each required alternate preferred power source (offsite circuit), via the train-aligned 4.16 kV crosstie between Unit 2 and Unit 3, demonstrates the OPERABILITY of the alternate preferred power distribution network to power the post-accident and shutdown loads. For 2A04 the normal offsite power source is 2XR1, and the alternate offsite power source is 3XR1 or 3XU1. For 2A06 the normal offsite power source is 2XR2, and the alternate offsite power source is 3XR2 or 3XU1. A required alternate offsite power source is the source that is credited as the alternate source of offsite power in LCO 3.8.1. Therefore, the alignment of the ESF buses in Unit 3 determines which alternate offsite circuit is the required circuit at any point in time.

For each 4.16 kV ESF bus (2A04 or 2A06) this surveillance requirement may be satisfied by performing both a manual transfer and an auto-transfer from the normal offsite power source to at least one of the alternate offsite power sources. The tested source may then be credited as the required alternate offsite power source per LCO 3.8.1. This surveillance may be satisfied for the remaining power source by performing a circuit functional test in addition to the transfer test above. This functional test shall be performed such that all components that are required to function for a successful manual or auto-transfer that were not included in the transfer tests above, are tested. This testing may include any series of sequential, overlapping, or total steps so that the entire manual and auto-transfer capability of the source is verified. This is explained in a note to this SR.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.1.8 (continued)

The 24 month Frequency of the Surveillance is based on engineering judgment, taking into consideration the unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths. Operating experience has shown that these components usually pass the SR when performed at the 24 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

This SR is modified by a Note which acknowledges that credit may be taken for unplanned events that satisfy this SR.

SR 3.8.1.9

Each DG is provided with an engine overspeed trip to prevent damage to the engine. Recovery from the transient caused by the loss of a large load could cause diesel engine overspeed, which, if excessive, might result in a trip of the engine. This Surveillance demonstrates the DG load response characteristics and capability to reject the largest single post-accident load without exceeding predetermined voltage and frequency and while maintaining a specified margin to the overspeed trip. For this unit, the largest single post-accident load for each DG is the Auxiliary Feedwater pump which has a nameplate rating of 800 HP. As required by IEEE-308 (Ref. 13), the load rejection test is acceptable if the DG frequency does not exceed 66.75 Hz, which is 75% of the difference between synchronous speed (60 Hz) and the overspeed trip setpoint (69 Hz).

The time, voltage, and frequency tolerances specified in this SR are derived from Regulatory Guide 1.9 (Ref. 3) recommendations for response during load sequencing and load rejection. The 4 seconds specified is equal to 80% of the 5 second load sequence interval associated with sequencing of the largest load. Since SONGS specific analyses demonstrate the acceptability of overlapping load groups (i.e., adjacent load groups that start at the same time due to load sequence timer tolerance), the use of 80% of load sequence interval for voltage recovery is consistent with the requirements of Regulatory Guide 1.9 (Ref. 3). The voltage and frequency specified are consistent with the design range of the equipment powered by the DG.
SR 3.8.1.9.a corresponds to the maximum frequency excursion,

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.1.9 (continued)

while SR 3.8.1.9.b and SR 3.8.1.9.c are steady state voltage and frequency values to which the system must recover following load rejection. The 24 month Frequency is consistent with the recommendation of Regulatory Guide 1.9 (Ref. 3).

In order to ensure that the DG is tested under load conditions that are as close to design basis conditions as possible, testing is performed by rejecting an inductive load with kW and kVAR greater than or equal to the single largest post-accident load (683 kW, 369 kVAR). These test conditions are consistent with the power factor requirements of Regulatory Guide 1.9 (Ref. 3) and the recommendations of Information Notice 91-13 (Ref. 16).

This SR is modified by ~~a~~ two Notes. ~~which~~ Note 1 acknowledges that credit may be taken for unplanned events that satisfy this SR. Note 2 - This note discusses operability of the diesel generator subcomponent Automatic Voltage Regulator (AVR). The AVR is an integral part of the DG, however, each DG has 2 AVRs that are 100% redundant to each other. Only one AVR may be in service at any one time. To ensure operability of each AVR, the AVR's must have been in service during the performance of SR 3.8.1.2 or SR 3.8.1.7 and SR 3.8.1.3 within the last 60 days, and each AVR must have been in service for either SR 3.8.1.9, SR 3.8.1.10, or SR 3.8.1.19 within the last 24 months. During the 24 month test dynamic performance of the AVR is measured to confirm it is acceptable for all required AVR transients. Based on the design of the AVR, its intended function, and the maintenance history, the above specified surveillance schedule will assure the AVR's are capable of performing their intended function.

SR 3.8.1.10

This Surveillance demonstrates the DG capability to reject a load equal to 90% to 100% of its continuous rating without overspeed tripping or exceeding the predetermined voltage limits. The lower load limit of 4450 kW is 94.7% of the DG continuous rating (4700 kW). The 94.7% limit is based on design basis loading and includes instrument uncertainty plus margin. Instrument uncertainty is not applied to the upper load limit.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.1.10 (continued)

The DG full load rejection may occur because of a system fault, inadvertent breaker tripping or a SIAS received during surveillance testing. This Surveillance ensures proper engine and generator load response under the simulated test conditions. This test simulates the loss of the total connected load that the DG experiences following a full load rejection and verifies that the DG will not trip upon loss of the load. The voltage transient limit of 5450 V is 125% of rated voltage (4360 V). These acceptance criteria provide DG damage protection. While the DG is not expected to experience this transient during an event and continues to be available, this response ensures that the DG is not degraded for future application (e.g., reconnection to the bus if the trip initiator can be corrected or isolated). These loads and limits are consistent with Regulatory Guide 1.9 (Ref. 3).

The DG is tested under inductive load conditions that are as close to design basis conditions as possible. Testing is performed with DG kVAR output that offsite power system conditions permit during testing without exceeding equipment ratings (i.e., without creating an overvoltage condition on the ESF buses, over excitation condition in the generator, or overloading the DG main feeder). The kVAR loading requirement during this test is met, and the equipment ratings are not exceeded, when the DG kVAR output is increased such that:

a. kVAR is ≥ 3000 and ≤ 3200 or
b. the excitation current is ≥ 3.8 A and ≤ 4.0 A or
c. the ESF bus voltage is ≥ 4530 V and ≤ 4550 V or
d. DG feeder current is ≥ 730 A and ≤ 750 A

This method of establishing kVAR loading ensures that, in addition to verifying the full load rejection capability (kW) of the diesel engine, the reactive power rejection capability (kVAR) of the generator is verified to the extent practicable, consistent with the recommendations of Regulatory Guide 1.9 (Ref. 3) and Information Notice 91-13 (Ref. 16).

The 24 month Frequency is consistent with the recommendation of Regulatory Guide 1.9 (Ref. 3) and is intended to be consistent with expected fuel cycle lengths.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.1.10 (continued)

This SR is modified by ~~a~~ two Notes. ~~which~~ Note 1 acknowledges that credit may be taken for unplanned events that satisfy this SR. Note 2 - This note discusses operability of the diesel generator subcomponent Automatic Voltage Regulator (AVR). The AVR is an integral part of the DG, however, each DG has 2 AVRs that are 100% redundant to each other. Only one AVR may be in service at any one time. To ensure operability of each AVR, the AVR's must have been in service during the performance of SR 3.8.1.2 or SR 3.8.1.7 and SR 3.8.1.3 within the last 60 days, and each AVR must have been in service for either SR 3.8.1.9, SR 3.8.1.10, or SR 3.8.1.19 within the last 24 months. During the 24 month test dynamic performance of the AVR is measured to confirm it is acceptable for all required AVR transients. Based on the design of the AVR, its intended function, and the maintenance history, the above specified surveillance schedule will assure the AVR's are capable of performing their intended function.

SR 3.8.1.11

As required by Regulatory Guide 1.9 (Ref. 3), this Surveillance demonstrates the as designed operation of the standby power sources during loss of the offsite source. This test verifies all actions encountered from the loss of offsite power, including shedding of selected loads and energization of the permanently connected loads from the DG. The permanently connected loads are the Class 1E 480 V Loadcenters and MCCs. It is recognized that certain consequential loads may also start following a loss of offsite power and therefore it is important to demonstrate that the DG operates properly with these loads. The consequential loads are sequenced on the DG following a LOVS with the same time delays as for a LOVS with a SIAS. Therefore, the ability of the DG to operate with the consequential loads is appropriately demonstrated by the existing Surveillance Requirement simulating a loss of offsite power in combination with a SIAS (Surveillance Requirement 3.8.1.19). Since there are no auto-connected shutdown loads, the Regulatory Guide 1.9 (Ref. 3) requirements for sequencing of auto-connected shutdown loads do not apply (Ref. 17). This surveillance further demonstrates the capability of the DG to automatically achieve the required voltage and frequency, to close the DG output breaker and connect to the ESF bus, and to reset the 4.16 kV bus undervoltage relay logic within the specified time.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.1.11 (continued)

The DG auto-start and undervoltage relay logic reset time of 10 seconds is derived from requirements of the accident analysis to respond to a design basis large break LOCA. The frequency should be restored to within the specified range following energization of the permanently connected loads. The Surveillance should be continued for a minimum of 5 minutes in order to demonstrate that all starting transients have decayed and stability has been achieved.

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

The Frequency of 24 months is consistent with the recommendations of Regulatory Guide 1.9 (Ref. 3), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by two Notes. The reason for Note 1 is to minimize wear and tear on the DGs during testing. For the purpose of this testing, the DGs must be started from standby conditions, that is, with the engine coolant and oil continuously circulated and temperature maintained consistent with manufacturer recommendations. Note 2 acknowledges that credit may be taken for unplanned events that satisfy this SR.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.12

This Surveillance demonstrates that after a SIAS, the DG automatically starts and achieves the required voltage and frequency within the specified time and operates for ≥ 5 minutes. The 9.4 second start requirement ensures that the DG meets the design basis LOCA analysis assumption, that the DG starts, accelerates to within the specified frequency and voltage limits, connects to the 4.16 kV ESF bus, and resets the ESF bus undervoltage relay logic within 10 seconds of a SIAS. The 5 minute period provides sufficient time to demonstrate stability.

In addition to the SR requirements, the time for the DG to reach steady state operation, unless the modified DG start method is employed, is periodically monitored and is evaluated to identify degradation of governor and voltage regulator performance.

The Frequency of 24 months is consistent with Regulatory Guide 1.9 (Ref. 3), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with the expected fuel cycle lengths. Operating experience has shown that these components usually pass the SR when performed at the 24 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

This SR is modified by two Notes. The reason for Note 1 is to minimize wear and tear on the DGs during testing. For the purpose of this testing, the DGs must be started from standby conditions, that is, with the engine coolant and oil continuously circulated and temperature maintained consistent with manufacturer recommendations. Note 2 acknowledges that credit may be taken for unplanned events that satisfy this SR.

SR 3.8.1.13

This Surveillance demonstrates that DG noncritical protective functions (e.g., high jacket water temperature) are bypassed on a SIAS in accordance with Regulatory Guide 1.9 (Ref. 3). The critical protective functions (engine overspeed, generator differential current, and low-low lube oil pressure), which trip the DG to avert substantial damage to the DG unit, are not bypassed. The noncritical trips are bypassed during DBAs and provide an alarm on an abnormal engine condition. This alarm provides the operator with sufficient time to react appropriately to prevent damage to the DG. The DG availability to mitigate the DBA is more critical thanprotecting the engine against minor problems that are not immediately detrimental to emergency operation of the DG.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.1.13 (continued)

Testing to satisfy this surveillance requirement may include any series of sequential, overlapping, or total steps so that the entire noncritical trip bypass function is verified.

The 24 month Frequency is based on engineering judgment, taking into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths. Operating experience has shown that these components usually pass the SR when performed at the 24 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint. The SR is modified by a Note which acknowledges that credit may be taken for unplanned events that satisfy this SR.

SR 3.8.1.14

Regulatory Guide 1.9 (Ref. 3), requires demonstration once per refueling outage that the DGs can start and run continuously at full load capability for an interval of not less than 24 hours, ≥ 2 hours of which is at load equivalent to 105% to 110% of the continuous duty rating and the remainder of the time at a load equivalent to 90% to 100% of the continuous duty rating of the DG. For the 22 hour duration, the lower load limit of 4450 kW is 94.7% of the DG continuous rating (4700 kW). The 94.7% limit is based on design basis loading and includes instrument uncertainty plus margin. Instrument uncertainty is not applied to the 100%, 105% or 110% load limits.

This test is performed with the DG connected to the offsite power supply. In this alignment DG frequency is controlled by the offsite power supply, and the operator has minimal control over DG output voltage. Therefore, specific DG voltage and frequency requirements as recommended by Regulatory Guide 1.9 (Ref. 3) do not apply.

The DG starts for this Surveillance can be performed either from standby or hot conditions. The provisions for prelubricating and warmup, discussed in SR 3.8.1.2, and for gradual loading, discussed in SR 3.8.1.3, are applicable to this SR.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.1.14 (continued)

The DG is tested under inductive load conditions that are as close to design conditions as possible. Testing is performed with DG kVAR output that offsite power system conditions permit during testing without exceeding equipment ratings (i.e., without creating an overvoltage condition on the ESF buses, over excitation condition in the generator, or overloading the DG main feeder). The kVAR loading requirement during this test is met, and the equipment ratings are not exceeded, when the DG kVAR output is increased such that:

a. kVAR is ≥ 3000 and ≤ 3200 or
b. the excitation current is ≥ 3.8 A and ≤ 4.0 A or
c. the ESF bus voltage is ≥ 4530 V and ≤ 4550 V or
d. DG feeder current is ≥ 730 A and ≤ 750 A

This method of establishing kVAR loading ensures that, in addition to verifying the load carrying capability (kW) of the diesel engine, the reactive power (kVAR) and voltage regulation capability of the generator is verified to the extent practicable, consistent with the recommendations of Regulatory Guide 1.9 (Ref. 3) and Information Notice 91-13 (Ref. 16).

The kW load band in the SR is provided to avoid routine overloading of the DG. Routine overloading may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain DG OPERABILITY.

The 24 month Frequency is consistent with the recommendations of Regulatory Guide 1.9, (Ref. 3), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

This Surveillance is modified by two Notes. Note 1 states that momentary DG load transients do not invalidate this test. Note 2 acknowledges that credit may be taken for unplanned events that satisfy this SR.

SR 3.8.1.15

This Surveillance demonstrates that the diesel engine can restart from a hot condition, such as subsequent to shutdown from normal Surveillances, and achieve the required voltage and frequency within 9.4 seconds. The 9.4 second time is

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BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.1.15 (continued)

derived from the requirements of the accident analysis to respond to a design basis large break LOCA. The LOCA analysis assumes that the DG starts, accelerates to within the specified frequency and voltage limits, connects to the 4.16 kV ESF bus, and resets the ESF bus undervoltage relay logic within 10 seconds of a SIAS.

In addition to the SR requirements, the time for the DG to reach steady state operation, unless the modified DG start method is employed, is periodically monitored and is evaluated to identify degradation of governor and voltage regulator performance.

The 24 month Frequency is consistent with the recommendations of Regulatory Guide 1.9 (Ref. 3) and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by two Notes. Note 1 ensures that the test is performed with the diesel sufficiently hot. The load band is provided to avoid routine overloading of the DG. Routine overloads may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain DG OPERABILITY. The requirement that the diesel has operated for at least 2 hours at full load conditions prior to performance of this Surveillance is based on manufacturer recommendations for achieving hot conditions. Momentary DG load transients do not invalidate this test. Note 2 allows all DG starts to be preceded by an engine prelube period to minimize wear and tear on the diesel during testing.

SR 3.8.1.16

As required by Regulatory Guide 1.9 (Ref. 3), this Surveillance ensures manual synchronization and load transfer from the DG to the offsite source can be made and that the DG can be returned to ready to load operation when offsite power is restored. Ready to load operation is defined as the DG running within the specified frequency and voltage limits, with the DG output breaker open. If this test is performed with a SIAS present, the load transfer occurs when the offsite power breaker is manually closed, and the SIAS causes the DG output breaker to open. If this test is performed without a SIAS present, the load transfer occurs when the offsite power breaker is manually closed, and the DG output breaker is manually opened. By design, the LOVS/SDVS/DGVSS logic will have been previously reset thus allowing the DG to reload if a subsequent loss of offsite power or degraded voltage condition occurs. The LOVS/SDVS/DGVSS signal will strip the bus, reset the load sequence timers, close the DG output breaker, and permit

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.1.16 (continued)

resequencing of the ESF loads if an ESF actuation signal is present.

The Frequency of 24 months is consistent with the recommendations of Regulatory Guide 1.9 (Ref. 3), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by a Note which acknowledges that credit may be taken for unplanned events that satisfy this SR.

SR 3.8.1.17

For this Surveillance, the DG is in test mode when it is running, connected to its bus, and in parallel with offsite power. Demonstration of the test mode override ensures that:

1) the DG availability under accident conditions will not be compromised as the result of testing with the DG connected to its bus in parallel with offsite power, and

2) the DG will automatically return to ready to load operation,

if a SIAS is received during operation in the test mode. Ready to load operation is defined as the DG running within the specified frequency and voltage limits, with the DG output breaker open. These provisions are required by IEEE-308 (Ref. 13), paragraph 6.2.6(2) and Regulatory Guide 1.9 (Ref. 3).

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

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.1.17 (continued)

The 24 month Frequency is consistent with the recommendations of Regulatory Guide 1.9 (Ref. 3), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by a Note which acknowledges that credit may be taken for unplanned events that satisfy this SR.

SR 3.8.1.18

Under accident conditions, electrical loads are sequentially connected to a DG bus by the programmed time interval load sequence. The sequencing logic controls the permissive and starting signals to motor breakers to prevent overloading of the DG due to high motor starting currents. The load sequence start time tolerance ensures that sufficient time exists for the DG to restore frequency and voltage prior to applying the next load and that safety analysis assumptions regarding ESF equipment time delays are not violated. Reference 2 provides a summary of the automatic loading of ESF buses. Table B 3.8.1-1 provides a matrix of loads sequenced by the ESF timing logic. The timer as-left setting requirement and the as-found acceptance criteria are provided in Table B 3.8.1-1.

For the Containment Emergency Cooling Units only, the sequenced time is the actual start time of the Component Cooling Water pumps plus 5 + 2.5/-0.5 seconds. The tolerance is based on a design interval of 5 seconds.

This testing may include any series of sequential, overlapping, or total steps so that all load sequence timers are verified.

(continued)

BASES (continued)

TABLE B 3.8.1-1: DG LOAD SEQUENCING TIMER ACCEPTANCE CRITERIA

		Start Time (Sec)	Nominal Setting (As Left) Tolerance (Sec)	As-Found Tolerance (Sec)
1.	LPSI Pumps P015, P016	5.00	±0.5	-0.5 +2.5
2.	Dome Air Circulating Fans A071, A072, A073, A074	5.00	±0.5	-0.5 +2.5
3.	Control Room AC Units E418, E419	5.00	±0.5	-0.5 +2.5
4.	Containment Spray Pumps P012, P013	10.00	±0.5	±2.5
5.	Diesel Generator Radiator Fans E546, E547, E549, E550	10.00	±0.5	±2.5
6.	Component Cooling Water Pumps P024, P025, P026	15.00	±0.5	±2.5
6A.	Containment Emergency Cooling Units E399, E400, E401, E402	CCW Pump Breaker Closure +5 secs	±0.5*	-0.5* +2.5*
7.	Diesel Generator Building Emergency Fans A274, A275, A276, A277	15.00	±0.5	±2.5
8.	Salt Water Cooling Pumps P112, P307, P113, P114	20.00	±0.5	±2.5
9.	Auxiliary Feed Water Pumps P141, P504	30.00	±0.5	±3.0
10.	Emergency Chillers E335, E336	35.00	±0.5	±3.5

*Emergency Cooling Unit time delay as measured from closure of the CCW pump breaker position switch 152-1.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.18 (continued)

As required by Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(2), each DG is required to demonstrate proper operation for the DBA loading sequence to ensure that voltage and frequency are maintained within the required limits. This surveillance is performed in SR 3.8.1.19. The sequence relays tested under SR 3.8.1.18 are required to support proper DG loading sequence.

The Frequency of 24 months is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(2); takes into consideration unit conditions required to perform the Surveillance; and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by a Note which acknowledges that credit may be taken for unplanned events that satisfy this SR.

SR 3.8.1.19

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

This Surveillance demonstrates the DG operation, as discussed in the Bases for SR 3.8.1.11, during an actual or simulated loss of offsite power signal (LOVS/DGVSS/SDVS) in conjunction with actual or simulated ESF actuation signals (SIAS, CCAS, CSAS, EFAS-1, and EFAS-2). Multiple ESF actuation signals are initiated to simulate worst case DG load sequencing conditions.

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

The Frequency of 24 months takes into consideration unit conditions required to perform the Surveillance and is intended to be consistent with an expected fuel cycle length of 24 months.

This SR is modified by ~~two~~ three Notes. The reason for Note 1 is to minimize wear and tear on the DGs during testing. For the purpose of this testing, the DGs must be started from standby conditions, that is, with the engine coolant and oil continuously circulated and temperature maintained consistent with manufacturer recommendations for DGs. Note 2 acknowledges that credit may be taken for

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.19 (continued)

unplanned events that satisfy this SR. Note 3 - This note discusses operability of the diesel generator subcomponent Automatic Voltage Regulator (AVR). The AVR is an integral part of the DG, however, each DG has 2 AVRs that are 100% redundant to each other. Only one AVR may be in service at any one time. To ensure operability of each AVR, the AVR's must have been in service during the performance of SR 3.8.1.2 or SR 3.8.1.7 and SR 3.8.1.3 within the last 60 days, and each AVR must have been in service for either SR 3.8.1.9, SR 3.8.1.10, or SR 3.8.1.19 within the last 24 months. During the 24 month test dynamic performance of the AVR is measured to confirm it is acceptable for all required AVR transients. Based on the design of the AVR, its intended function, and the maintenance history, the above specified surveillance schedule will assure the AVR's are capable of performing their intended function.

SR 3.8.1.20

This Surveillance demonstrates that the DG starting independence has not been compromised. This Surveillance demonstrates that each engine can achieve proper speed within the specified time when the DGs are started simultaneously.

The 10 year Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.b, Regulatory Guide 1.137 (Ref. 10), paragraph C.2.f, and Regulatory Guide 1.9 (Ref. 3).

This SR is modified by a Note. The reason for the Note is to minimize wear on the DG during testing. For the purpose of this testing, the DGs must be started from standby conditions, that is, with the engine coolant and oil continuously circulated, and temperature maintained consistent with manufacturer recommendations.

Diesel Generator Test Schedule

The DG test schedule (Table 3.8.1-1) implements the recommendations of Revision 3 to Regulatory Guide 1.9 (Ref. 3). The purpose of this test schedule is to provide timely test data to establish a confidence level associated with the goal to maintain DG reliability above 0.95 per demand.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.20 (continued)

According to Regulatory Guide 1.9, Revision 3 (Ref. 3), each DG unit should be tested at least once every 31 days. According to Draft Regulatory Guide DG-1021 (Ref. 14) and 10 CFR 50.63(a)(3)(ii) (Ref. 15), whenever a DG has experienced 4 or more valid failures in the last 25 valid tests, the maximum time between tests is reduced to 7 days. Four failures in 25 valid tests is a failure rate of 0.16, or the threshold of acceptable DG performance, and hence may be an early indication of the degradation of DG reliability.

When considered in the light of a long history of tests, 4 failures in the last 25 valid tests may only be a statistically probable distribution of random events. Increasing the test Frequency will allow for a more timely accumulation of additional test data upon which to base judgment of the reliability of the DG. The increased test Frequency must be maintained until seven consecutive, failure free tests have been performed.

The Frequency for accelerated testing is 7 days, but no less than 24 hours. Therefore, the interval between tests should be no less than 24 hours, and no more than 7 days. A successful test at an interval of less than 24 hours should be considered an invalid test and not count towards the seven consecutive failure free starts. A test interval in excess of 7 days constitutes a failure to meet the Srs.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 17.
2. UFSAR, Chapter 8.
3. Regulatory Guide 1.9, Rev. 3.
4. UFSAR, Chapter 6.
5. UFSAR, Chapter 15.
6. Regulatory Guide 1.93, Rev. 0.
7. Generic Letter 84-15.
8. 10 CFR 50, Appendix A, GDC 18.
9. Regulatory Guide 1.108, Rev. 1.
10. Regulatory Guide 1.137, Rev. 1.

(continued)

BASES (continued)

REFERENCES (continued)

11. ANSI C84.1-1982.

12. ASME, Boiler and Pressure Vessel Code, Section XI.

13. IEEE Standard 308-1978.

14. Draft Regulatory Guide DG-1021, April 1992.

15. 10 CFR 50.63(a)(3)(ii) as published in Federal Register Vol. 57, No. 77 page 14517, April 21, 1992.

16. Information Notice 91-13, "INADEQUATE TESTING OF EMERGENCY DIESEL GENERATORS (EGDs)," 09/16/91.

17. Letter from SCE to the NRC dated May 5, 1995, subject Docket Nos. 50-361 and 50-362, Diesel Generator Loading San Onofre Nuclear Generating Station Units 2 and 3.

18. Letter from the NRC to SCE dated May 12, 1999, subject Technical Specification Interpretation (TAC Nos. MA0232 and MA0233).

Attachment H

(Proposed Bases Pages)

SONGS Unit 3

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.1.2 and SR 3.8.1.7 (continued)

The normal 31 day Frequency for SR 3.8.1.2 (see Table 3.8.1-1, "Diesel Generator Test Schedule," in the accompanying LCO) and the 184 day Frequency for SR 3.8.1.7 are consistent with Regulatory Guide 1.9 (Ref. 3). These frequencies provide adequate assurance of DG OPERABILITY, while minimizing degradation resulting from testing.
Note 4 - This note discusses operability of the diesel generator subcomponent Automatic Voltage Regulator (AVR). The AVR is an integral part of the DG, however, each DG has 2 AVRs that are 100% redundant to each other. Only one AVR may be in service at any one time. To ensure operability of each AVR, the AVR's must have been in service during the performance of SR 3.8.1.2 or SR 3.8.1.7 and SR 3.8.1.3 within the last 60 days, and each AVR must have been in service for either SR 3.8.1.9, SR 3.8.1.10, or SR 3.8.1.19 within the last 24 months. During the 24 month test dynamic performance of the AVR is measured to confirm it is acceptable for all required AVR transients. Based on the design of the AVR, its intended function, and the maintenance history, the above specified surveillance schedule will assure the AVR's are capable of performing their intended function.

SR 3.8.1.3

This Surveillance verifies that the DGs are capable of synchronizing with the offsite electrical system and accepting loads greater than or equal to the equivalent of the maximum expected accident loads listed in Reference 2. This capability is verified by performing a load test between 90 to 100% of rated load, for an interval of not less than 60 minutes, consistent with the requirements of Regulatory Guide 1.9 (Ref. 3). The lower load limit of 4450 kW is 94.7% of the DG continuous rating (4700 kW). The 94.7% limit is based on design basis loading and includes instrument uncertainty plus margin. Instrument uncertainty is not applied to the upper load limit. A minimum run time of 60 minutes is required to stabilize engine temperatures, while minimizing the time that the DG is connected to the offsite source.

Although no power factor requirements are established by this SR, the surveillance is performed with DG kVAR output that offsite power system conditions permit during testing without exceeding equipment ratings (i.e., without creating an overvoltage condition on the ESF buses, over excitation condition on the ESF buses, over excitation condition in the generator, or overloading the DG main feeder). The kVAR loading requirement during this test is met, and the equipment ratings are not exceeded, when the DG kVAR output is increased such that:

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.1.3 (continued)

a. kVAR is ≥ 3000 and ≤ 3200 or
b. the excitation current is ≥ 3.8 A and ≤ 4.0 A or
c. the ESF bus voltage is ≥ 4530 V and ≤ 4550 V or
d. DG feeder current is ≥ 730 A and ≤ 750 A

This method of establishing kVAR loading ensures that, in addition to verifying the load carrying capability (kW) of the diesel engine, the reactive power (kVAR) and voltage regulation capability of the generator is verified to the extent practicable, consistent with the recommendations of Regulatory Guide 1.9 (Ref. 3) and Information Notice 91-13 (Ref. 16).

The normal 31 day Frequency for this Surveillance (Table 3.8.1-1) is consistent with Regulatory Guide 1.9 (Ref. 3).

This SR is modified by ~~four~~ five Notes. Note 1 indicates that diesel engine runs for this Surveillance may include gradual loading, as recommended by the manufacturer, so that mechanical stress and wear on the diesel engine are minimized. Note 2 states that momentary DG load transients do not invalidate this test. Note 3 indicates that this Surveillance should be conducted on only one DG at a time in order to avoid common cause failures that might result from offsite circuit or grid perturbations. Note 4 stipulates that a successful DG start must precede this test to credit satisfactory performance. Note 5 - This note discusses operability of the diesel generator subcomponent Automatic Voltage Regulator (AVR). The AVR is an integral part of the DG, however, each DG has 2 AVRs that are 100% redundant to each other. Only one AVR may be in service at any one time. To ensure operability of each AVR, the AVR's must have been in service during the performance of SR 3.8.1.2 or SR 3.8.1.7 and SR 3.8.1.3 within the last 60 days, and each AVR must have been in service for either SR 3.8.1.9, SR 3.8.1.10, or SR 3.8.1.19 within the last 24 months. During the 24 month test dynamic performance of the AVR is measured to confirm it is acceptable for all required AVR transients. Based on the design of the AVR, its intended function, and the maintenance history, the above specified surveillance schedule will assure the AVR's are capable of performing their intended function.

SR 3.8.1.4

This SR provides verification that the level of fuel oil in the day tank is at or above the level selected to ensure adequate fuel oil for a minimum of 1 hour of DG operation at full load plus 10%. The level is expressed as an equivalent volume in inches. The 30 inch level includes instrument

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.1.4 (continued)

uncertainties and corresponds to the minimum requirement of 355.1 gallons of fuel oil.

The 31 day Frequency is adequate to assure that a sufficient supply of fuel oil is available, since low level alarms are provided and unit operators would be aware of any large uses of fuel oil during this period.

SR 3.8.1.5

Microbiological fouling is a major cause of fuel oil degradation. There are numerous microorganisms that can grow in fuel oil and cause fouling, but all must have a water environment in order to survive. Removal of water from the fuel oil day tanks once every 31 days eliminates the necessary environment for microbial survival in the day tanks. This is the most effective means of controlling microbiological fouling. In addition, it eliminates the potential for water entrainment in the fuel oil during DG operation. Water may come from any of several sources, including condensation, ground water, rain water, contaminated fuel oil, and from breakdown of the fuel oil by microorganisms. Frequent checking for and removal of accumulated water minimizes fouling and provides data regarding the watertight integrity of the fuel oil system. The Surveillance Frequencies are established by Regulatory Guide 1.137 (Ref. 10). This SR is for preventive maintenance. The presence of water does not necessarily represent failure of this SR provided the accumulated water is removed during the performance of this Surveillance.

SR 3.8.1.6

This Surveillance demonstrates that for each OPERABLE DG at least one fuel oil transfer pump operates and transfers fuel oil from its associated storage tank to its associated day tank. This is required to support continuous operation of the standby power source. This Surveillance provides assurance that at least one fuel oil transfer pump is OPERABLE, the fuel oil piping system is intact, the fuel delivery piping is not obstructed, and the controls and control systems for the fuel transfer system are OPERABLE.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.1.6 (continued)

The design of the fuel transfer system is such that one pump will operate automatically, while the other pump can be started manually. Either pump will maintain an adequate volume of fuel oil in the day tank. In such a case, a 31 day Frequency is appropriate.

SR 3.8.1.7

See SR 3.8.1.2.

SR 3.8.1.8

Verification of the capability to transfer each 4.16 kV ESF bus power supply from the normal preferred power source (offsite circuit) to each required alternate preferred power source (offsite circuit), via the train-aligned 4.16 kV crosstie between Unit 2 and Unit 3, demonstrates the OPERABILITY of the alternate preferred power distribution network to power the post-accident and shutdown loads. For 2A04 the normal offsite power source is 2XR1, and the alternate offsite power source is 3XR1 or 3XU1. For 2A06 the normal offsite power source is 2XR2, and the alternate offsite power source is 3XR2 or 3XU1. A required alternate offsite power source is the source that is credited as the alternate source of offsite power in LCO 3.8.1. Therefore, the alignment of the ESF buses in Unit 3 determines which alternate offsite circuit is the required circuit at any point in time.

For each 4.16 kV ESF bus (2A04 or 2A06) this surveillance requirement may be satisfied by performing both a manual transfer and an auto-transfer from the normal offsite power source to at least one of the alternate offsite power sources. The tested source may then be credited as the required alternate offsite power source per LCO 3.8.1. This surveillance may be satisfied for the remaining power source by performing a circuit functional test in addition to the transfer test above. This functional test shall be performed such that all components that are required to function for a successful manual or auto-transfer that were not included in the transfer tests above, are tested. This testing may include any series of sequential, overlapping, or total steps so that the entire manual and auto-transfer capability of the source is verified. This is explained in a note to this SR.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.1.8 (continued)

The 24 month Frequency of the Surveillance is based on engineering judgment, taking into consideration the unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths. Operating experience has shown that these components usually pass the SR when performed at the 24 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

This SR is modified by a Note which acknowledges that credit may be taken for unplanned events that satisfy this SR.

SR 3.8.1.9

Each DG is provided with an engine overspeed trip to prevent damage to the engine. Recovery from the transient caused by the loss of a large load could cause diesel engine overspeed, which, if excessive, might result in a trip of the engine. This Surveillance demonstrates the DG load response characteristics and capability to reject the largest single post-accident load without exceeding predetermined voltage and frequency and while maintaining a specified margin to the overspeed trip. For this unit, the largest single post-accident load for each DG is the Auxiliary Feedwater pump which has a nameplate rating of 800 HP. As required by IEEE-308 (Ref. 13), the load rejection test is acceptable if the DG frequency does not exceed 66.75 Hz, which is 75% of the difference between synchronous speed (60 Hz) and the overspeed trip setpoint (69 Hz).

The time, voltage, and frequency tolerances specified in this SR are derived from Regulatory Guide 1.9 (Ref. 3) recommendations for response during load sequencing and load rejection. The 4 seconds specified is equal to 80% of the 5 second load sequence interval associated with sequencing of the largest load. Since SONGS specific analyses demonstrate the acceptability of overlapping load groups (i.e., adjacent load groups that start at the same time due to load sequence timer tolerance), the use of 80% of load sequence interval for voltage recovery is consistent with the requirements of Regulatory Guide 1.9 (Ref. 3). The voltage and frequency specified are consistent with the design range of the equipment powered by the DG.
SR 3.8.1.9.a corresponds to the maximum frequency excursion,

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.1.9 (continued)

while SR 3.8.1.9.b and SR 3.8.1.9.c are steady state voltage and frequency values to which the system must recover following load rejection. The 24 month Frequency is consistent with the recommendation of Regulatory Guide 1.9 (Ref. 3).

In order to ensure that the DG is tested under load conditions that are as close to design basis conditions as possible, testing is performed by rejecting an inductive load with kW and kVAR greater than or equal to the single largest post-accident load (683 kW, 369 kVAR). These test conditions are consistent with the power factor requirements of Regulatory Guide 1.9 (Ref. 3) and the recommendations of Information Notice 91-13 (Ref. 16).

This SR is modified by ~~a~~ two Notes. ~~which~~ Note 1 acknowledges that credit may be taken for unplanned events that satisfy this SR. Note 2 - This note discusses operability of the diesel generator subcomponent Automatic Voltage Regulator (AVR). The AVR is an integral part of the DG, however, each DG has 2 AVRs that are 100% redundant to each other. Only one AVR may be in service at any one time. To ensure operability of each AVR, the AVR's must have been in service during the performance of SR 3.8.1.2 or SR 3.8.1.7 and SR 3.8.1.3 within the last 60 days, and each AVR must have been in service for either SR 3.8.1.9, SR 3.8.1.10, or SR 3.8.1.19 within the last 24 months. During the 24 month test dynamic performance of the AVR is measured to confirm it is acceptable for all required AVR transients. Based on the design of the AVR, its intended function, and the maintenance history, the above specified surveillance schedule will assure the AVR's are capable of performing their intended function.

SR 3.8.1.10

This Surveillance demonstrates the DG capability to reject a load equal to 90% to 100% of its continuous rating without overspeed tripping or exceeding the predetermined voltage limits. The lower load limit of 4450 kW is 94.7% of the DG continuous rating (4700 kW). The 94.7% limit is based on design basis loading and includes instrument uncertainty plus margin. Instrument uncertainty is not applied to the upper load limit.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.1.10 (continued)

The DG full load rejection may occur because of a system fault, inadvertent breaker tripping or a SIAS received during surveillance testing. This Surveillance ensures proper engine and generator load response under the simulated test conditions. This test simulates the loss of the total connected load that the DG experiences following a full load rejection and verifies that the DG will not trip upon loss of the load. The voltage transient limit of 5450 V is 125% of rated voltage (4360 V). These acceptance criteria provide DG damage protection. While the DG is not expected to experience this transient during an event and continues to be available, this response ensures that the DG is not degraded for future application (e.g., reconnection to the bus if the trip initiator can be corrected or isolated). These loads and limits are consistent with Regulatory Guide 1.9 (Ref. 3).

The DG is tested under inductive load conditions that are as close to design basis conditions as possible. Testing is performed with DG kVAR output that offsite power system conditions permit during testing without exceeding equipment ratings (i.e., without creating an overvoltage condition on the ESF buses, over excitation condition in the generator, or overloading the DG main feeder). The kVAR loading requirement during this test is met, and the equipment ratings are not exceeded, when the DG kVAR output is increased such that:

a. kVAR is ≥ 3000 and ≤ 3200 or
b. the excitation current is ≥ 3.8 A and ≤ 4.0 A or
c. the ESF bus voltage is ≥ 4530 V and ≤ 4550 V or
d. DG feeder current is ≥ 730 A and ≤ 750 A

This method of establishing kVAR loading ensures that, in addition to verifying the full load rejection capability (kW) of the diesel engine, the reactive power rejection capability (kVAR) of the generator is verified to the extent practicable, consistent with the recommendations of Regulatory Guide 1.9 (Ref. 3) and Information Notice 91-13 (Ref. 16).

The 24 month Frequency is consistent with the recommendation of Regulatory Guide 1.9 (Ref. 3) and is intended to be consistent with expected fuel cycle lengths.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.1.10 (continued)

This SR is modified by ~~a~~ two Notes. ~~which~~ Note 1 acknowledges that credit may be taken for unplanned events that satisfy this SR. Note 2 - This note discusses operability of the diesel generator subcomponent Automatic Voltage Regulator (AVR). The AVR is an integral part of the DG, however, each DG has 2 AVRs that are 100% redundant to each other. Only one AVR may be in service at any one time. To ensure operability of each AVR, the AVR's must have been in service during the performance of SR 3.8.1.2 or SR 3.8.1.7 and SR 3.8.1.3 within the last 60 days, and each AVR must have been in service for either SR 3.8.1.9, SR 3.8.1.10, or SR 3.8.1.19 within the last 24 months. During the 24 month test dynamic performance of the AVR is measured to confirm it is acceptable for all required AVR transients. Based on the design of the AVR, its intended function, and the maintenance history, the above specified surveillance schedule will assure the AVR's are capable of performing their intended function.

SR 3.8.1.11

As required by Regulatory Guide 1.9 (Ref. 3), this Surveillance demonstrates the as designed operation of the standby power sources during loss of the offsite source. This test verifies all actions encountered from the loss of offsite power, including shedding of selected loads and energization of the permanently connected loads from the DG. The permanently connected loads are the Class 1E 480 V Loadcenters and MCCs. It is recognized that certain consequential loads may also start following a loss of offsite power and therefore it is important to demonstrate that the DG operates properly with these loads. The consequential loads are sequenced on the DG following a LOVS with the same time delays as for a LOVS with a SIAS. Therefore, the ability of the DG to operate with the consequential loads is appropriately demonstrated by the existing Surveillance Requirement simulating a loss of offsite power in combination with a SIAS (Surveillance Requirement 3.8.1.19). Since there are no auto-connected shutdown loads, the Regulatory Guide 1.9 (Ref. 3) requirements for sequencing of auto-connected shutdown loads do not apply (Ref. 17). This surveillance further demonstrates the capability of the DG to automatically achieve the required voltage and frequency, to close the DG output breaker and connect to the ESF bus, and to reset the 4.16 kV bus undervoltage relay logic within the specified time.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.1.11 (continued)

The DG auto-start and undervoltage relay logic reset time of 10 seconds is derived from requirements of the accident analysis to respond to a design basis large break LOCA. The frequency should be restored to within the specified range following energization of the permanently connected loads. The Surveillance should be continued for a minimum of 5 minutes in order to demonstrate that all starting transients have decayed and stability has been achieved.

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

The Frequency of 24 months is consistent with the recommendations of Regulatory Guide 1.9 (Ref. 3), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by two Notes. The reason for Note 1 is to minimize wear and tear on the DGs during testing. For the purpose of this testing, the DGs must be started from standby conditions, that is, with the engine coolant and oil continuously circulated and temperature maintained consistent with manufacturer recommendations. Note 2 acknowledges that credit may be taken for unplanned events that satisfy this SR.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.12

This Surveillance demonstrates that after a SIAS, the DG automatically starts and achieves the required voltage and frequency within the specified time and operates for ≥ 5 minutes. The 9.4 second start requirement ensures that the DG meets the design basis LOCA analysis assumption, that the DG starts, accelerates to within the specified frequency and voltage limits, connects to the 4.16 kV ESF bus, and resets the ESF bus undervoltage relay logic within 10 seconds of a SIAS. The 5 minute period provides sufficient time to demonstrate stability.

In addition to the SR requirements, the time for the DG to reach steady state operation, unless the modified DG start method is employed, is periodically monitored and is evaluated to identify degradation of governor and voltage regulator performance.

The Frequency of 24 months is consistent with Regulatory Guide 1.9 (Ref. 3), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with the expected fuel cycle lengths. Operating experience has shown that these components usually pass the SR when performed at the 24 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

This SR is modified by two Notes. The reason for Note 1 is to minimize wear and tear on the DGs during testing. For the purpose of this testing, the DGs must be started from standby conditions, that is, with the engine coolant and oil continuously circulated and temperature maintained consistent with manufacturer recommendations. Note 2 acknowledges that credit may be taken for unplanned events that satisfy this SR.

SR 3.8.1.13

This Surveillance demonstrates that DG noncritical protective functions (e.g., high jacket water temperature) are bypassed on a SIAS in accordance with Regulatory Guide 1.9 (Ref. 3). The critical protective functions (engine overspeed, generator differential current, and low-low lube oil pressure), which trip the DG to avert substantial damage to the DG unit, are not bypassed. The noncritical trips are bypassed during DBAs and provide an alarm on an abnormal engine condition. This alarm provides the operator with sufficient time to react appropriately to prevent damage to the DG. The DG availability to mitigate the DBA is more critical than protecting the engine against minor problems that are not immediately detrimental to emergency operation of the DG.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.1.13 (continued)

Testing to satisfy this surveillance requirement may include any series of sequential, overlapping, or total steps so that the entire noncritical trip bypass function is verified.

The 24 month Frequency is based on engineering judgment, taking into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths. Operating experience has shown that these components usually pass the SR when performed at the 24 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

The SR is modified by a Note which acknowledges that credit may be taken for unplanned events that satisfy this SR.

SR 3.8.1.14

Regulatory Guide 1.9 (Ref. 3), requires demonstration once per refueling outage that the DGs can start and run continuously at full load capability for an interval of not less than 24 hours, ≥ 2 hours of which is at load equivalent to 105% to 110% of the continuous duty rating and the remainder of the time at a load equivalent to 90% to 100% of the continuous duty rating of the DG. For the 22 hour duration, the lower load limit of 4450 kW is 94.7% of the DG continuous rating (4700 kW). The 94.7% limit is based on design basis loading and includes instrument uncertainty plus margin. Instrument uncertainty is not applied to the 100%, 105% or 110% load limits.

This test is performed with the DG connected to the offsite power supply. In this alignment DG frequency is controlled by the offsite power supply, and the operator has minimal control over DG output voltage. Therefore, specific DG voltage and frequency requirements as recommended by Regulatory Guide 1.9 (Ref. 3) do not apply.

The DG starts for this Surveillance can be performed either from standby or hot conditions. The provisions for prelubricating and warmup, discussed in SR 3.8.1.2, and for gradual loading, discussed in SR 3.8.1.3, are applicable to this SR.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.1.14 (continued)

The DG is tested under inductive load conditions that are as close to design conditions as possible. Testing is performed with DG kVAR output that offsite power system conditions permit during testing without exceeding equipment ratings (i.e., without creating an overvoltage condition on the ESF buses, over excitation condition in the generator, or overloading the DG main feeder). The kVAR loading requirement during this test is met, and the equipment ratings are not exceeded, when the DG kVAR output is increased such that:

a. kVAR is ≥ 3000 and ≤ 3200 or
b. the excitation current is ≥ 3.8 A and ≤ 4.0 A or
c. the ESF bus voltage is ≥ 4530 V and ≤ 4550 V or
d. DG feeder current is ≥ 730 A and ≤ 750 A

This method of establishing kVAR loading ensures that, in addition to verifying the load carrying capability (kW) of the diesel engine, the reactive power (kVAR) and voltage regulation capability of the generator is verified to the extent practicable, consistent with the recommendations of Regulatory Guide 1.9 (Ref. 3) and Information Notice 91-13 (Ref. 16).

The kW load band in the SR is provided to avoid routine overloading of the DG. Routine overloading may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain DG OPERABILITY.

The 24 month Frequency is consistent with the recommendations of Regulatory Guide 1.9, (Ref. 3), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

This Surveillance is modified by two Notes. Note 1 states that momentary DG load transients do not invalidate this test. Note 2 acknowledges that credit may be taken for unplanned events that satisfy this SR.

SR 3.8.1.15

This Surveillance demonstrates that the diesel engine can restart from a hot condition, such as subsequent to shutdown from normal Surveillances, and achieve the required voltage and frequency within 9.4 seconds. The 9.4 second time is

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.1.15 (continued)

derived from the requirements of the accident analysis to respond to a design basis large break LOCA. The LOCA analysis assumes that the DG starts, accelerates to within the specified frequency and voltage limits, connects to the 4.16 kV ESF bus, and resets the ESF bus undervoltage relay logic within 10 seconds of a SIAS.

In addition to the SR requirements, the time for the DG to reach steady state operation, unless the modified DG start method is employed, is periodically monitored and is evaluated to identify degradation of governor and voltage regulator performance.

The 24 month Frequency is consistent with the recommendations of Regulatory Guide 1.9 (Ref. 3) and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by two Notes. Note 1 ensures that the test is performed with the diesel sufficiently hot. The load band is provided to avoid routine overloading of the DG. Routine overloads may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain DG OPERABILITY. The requirement that the diesel has operated for at least 2 hours at full load conditions prior to performance of this Surveillance is based on manufacturer recommendations for achieving hot conditions. Momentary DG load transients do not invalidate this test. Note 2 allows all DG starts to be preceded by an engine prelube period to minimize wear and tear on the diesel during testing.

SR 3.8.1.16

As required by Regulatory Guide 1.9 (Ref. 3), this Surveillance ensures manual synchronization and load transfer from the DG to the offsite source can be made and that the DG can be returned to ready to load operation when offsite power is restored. Ready to load operation is defined as the DG running within the specified frequency and voltage limits, with the DG output breaker open. If this test is performed with a SIAS present, the load transfer occurs when the offsite power breaker is manually closed, and the SIAS causes the DG output breaker to open. If this test is performed without a SIAS present, the load transfer occurs when the offsite power breaker is manually closed, and the DG output breaker is manually opened. By design, the LOVS/SDVS/DGVSS logic will have been previously reset thus allowing the DG to reload if a subsequent loss of offsite power or degraded voltage condition occurs. The LOVS/SDVS/DGVSS signal will strip the bus, reset the load sequence timers, close the DG output breaker, and permit

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.1.16 (continued)

resequencing of the ESF loads if an ESF actuation signal is present.

The Frequency of 24 months is consistent with the recommendations of Regulatory Guide 1.9 (Ref. 3), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by a Note which acknowledges that credit may be taken for unplanned events that satisfy this SR.

SR 3.8.1.17

For this Surveillance, the DG is in test mode when it is running, connected to its bus, and in parallel with offsite power. Demonstration of the test mode override ensures that:

1) the DG availability under accident conditions will not be compromised as the result of testing with the DG connected to its bus in parallel with offsite power, and

2) the DG will automatically return to ready to load operation,

if a SIAS is received during operation in the test mode. Ready to load operation is defined as the DG running within the specified frequency and voltage limits, with the DG output breaker open. These provisions are required by IEEE-308 (Ref. 13), paragraph 6.2.6(2) and Regulatory Guide 1.9 (Ref. 3).

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

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.1.17 (continued)

The 24 month Frequency is consistent with the recommendations of Regulatory Guide 1.9 (Ref. 3), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by a Note which acknowledges that credit may be taken for unplanned events that satisfy this SR.

SR 3.8.1.18

Under accident conditions, electrical loads are sequentially connected to a DG bus by the programmed time interval load sequence. The sequencing logic controls the permissive and starting signals to motor breakers to prevent overloading of the DG due to high motor starting currents. The load sequence start time tolerance ensures that sufficient time exists for the DG to restore frequency and voltage prior to applying the next load and that safety analysis assumptions regarding ESF equipment time delays are not violated. Reference 2 provides a summary of the automatic loading of ESF buses. Table B 3.8.1-1 provides a matrix of loads sequenced by the ESF timing logic. The timer as-left setting requirement and the as-found acceptance criteria are provided in Table B 3.8.1-1.

For the Containment Emergency Cooling Units only, the sequenced time is the actual start time of the Component Cooling Water pumps plus 5 + 2.5/-0.5 seconds. The tolerance is based on a design interval of 5 seconds.

This testing may include any series of sequential, overlapping, or total steps so that all load sequence timers are verified.

(continued)

BASES (continued)

TABLE B 3.8.1-1: DG LOAD SEQUENCING TIMER ACCEPTANCE CRITERIA

		Start Time (Sec)	Nominal Setting (As Left) Tolerance (Sec)	As-Found Tolerance (Sec)
1.	LPSI Pumps P015, P016	5.00	±0.5	-0.5 +2.5
2.	Dome Air Circulating Fans A071, A072, A073, A074	5.00	±0.5	-0.5 +2.5
3.	Control Room AC Units E418, E419	5.00	±0.5	-0.5 +2.5
4.	Containment Spray Pumps P012, P013	10.00	±0.5	±2.5
5.	Diesel Generator Radiator Fans E546, E547, E549, E550	10.00	±0.5	±2.5
6.	Component Cooling Water Pumps P024, P025, P026	15.00	±0.5	±2.5
6A.	Containment Emergency Cooling Units E399, E400, E401, E402	CCW Pump Breaker Closure +5 secs	±0.5*	-0.5* +2.5*
7.	Diesel Generator Building Emergency Fans A274, A275, A276, A277	15.00	±0.5	±2.5
8.	Salt Water Cooling Pumps P112, P307, P113, P114	20.00	±0.5	±2.5
9.	Auxiliary Feed Water Pumps P141, P504	30.00	±0.5	±3.0
10.	Emergency Chillers E335, E336	35.00	±0.5	±3.5

*Emergency Cooling Unit time delay as measured from closure of the CCW pump breaker position switch 152-1.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.18 (continued)

As required by Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(2), each DG is required to demonstrate proper operation for the DBA loading sequence to ensure that voltage and frequency are maintained within the required limits. This surveillance is performed in SR 3.8.1.19. The sequence relays tested under SR 3.8.1.18 are required to support proper DG loading sequence.

The Frequency of 24 months is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(2); takes into consideration unit conditions required to perform the Surveillance; and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by a Note which acknowledges that credit may be taken for unplanned events that satisfy this SR.

SR 3.8.1.19

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

This Surveillance demonstrates the DG operation, as discussed in the Bases for SR 3.8.1.11, during an actual or simulated loss of offsite power signal (LOVS/DGVSS/SDVS) in conjunction with actual or simulated ESF actuation signals (SIAS, CCAS, CSAS, EFAS-1, and EFAS-2). Multiple ESF actuation signals are initiated to simulate worst case DG load sequencing conditions.

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

The Frequency of 24 months takes into consideration unit conditions required to perform the Surveillance and is intended to be consistent with an expected fuel cycle length of 24 months.

This SR is modified by ~~two~~ three Notes. The reason for Note 1 is to minimize wear and tear on the DGs during testing. For the purpose of this testing, the DGs must be started from standby conditions, that is, with the engine coolant and oil continuously circulated and temperature maintained consistent with manufacturer recommendations for DGs. Note 2 acknowledges that credit may be taken for

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.19

unplanned events that satisfy this SR. Note 3 - This note discusses operability of the diesel generator subcomponent Automatic Voltage Regulator (AVR). The AVR is an integral part of the DG, however, each DG has 2 AVRs that are 100% redundant to each other. Only one AVR may be in service at any one time. To ensure operability of each AVR, the AVR's must have been in service during the performance of SR 3.8.1.2 or SR 3.8.1.7 and SR 3.8.1.3 within the last 60 days, and each AVR must have been in service for either SR 3.8.1.9, SR 3.8.1.10, or SR 3.8.1.19 within the last 24 months. During the 24 month test dynamic performance of the AVR is measured to confirm it is acceptable for all required AVR transients. Based on the design of the AVR, its intended function, and the maintenance history, the above specified surveillance schedule will assure the AVR's are capable of performing their intended function.

SR 3.8.1.20

This Surveillance demonstrates that the DG starting independence has not been compromised. Surveillance demonstrates that each engine can achieve proper speed within the specified time when the DGs are started simultaneously.

The 10 year Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.b, Regulatory Guide 1.137 (Ref. 10), paragraph C.2.f, and Regulatory Guide 1.9 (Ref. 3).

This SR is modified by a Note. The reason for the Note is to minimize wear on the DG during testing. For the purpose of this testing, the DGs must be started from standby conditions, that is, with the engine coolant and oil continuously circulated, and temperature maintained consistent with manufacturer recommendations.

Diesel Generator Test Schedule

The DG test schedule (Table 3.8.1-1) implements the recommendations of Revision 3 to Regulatory Guide 1.9 (Ref. 3). The purpose of this test schedule is to provide timely test data to establish a confidence level associated with the goal to maintain DG reliability above 0.95 per demand.

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BASES (continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.20 (continued)

According to Regulatory Guide 1.9, Revision 3 (Ref. 3), each DG unit should be tested at least once every 31 days. According to Draft Regulatory Guide DG-1021 (Ref. 14) and 10 CFR 50.63(a)(3)(ii) (Ref. 15), whenever a DG has experienced 4 or more valid failures in the last 25 valid tests, the maximum time between tests is reduced to 7 days. Four failures in 25 valid tests is a failure rate of 0.16, or the threshold of acceptable DG performance, and hence may be an early indication of the degradation of DG reliability.

When considered in the light of a long history of tests, 4 failures in the last 25 valid tests may only be a statistically probable distribution of random events. Increasing the test Frequency will allow for a more timely accumulation of additional test data upon which to base judgment of the reliability of the DG. The increased test Frequency must be maintained until seven consecutive, failure free tests have been performed.

The Frequency for accelerated testing is 7 days, but no less than 24 hours. Therefore, the interval between tests should be no less than 24 hours, and no more than 7 days. A successful test at an interval of less than 24 hours should be considered an invalid test and not count towards the seven consecutive failure free starts. A test interval in excess of 7 days constitutes a failure to meet the SRs.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 17.
2. UFSAR, Chapter 8.
3. Regulatory Guide 1.9, Rev. 3.
4. UFSAR, Chapter 6.
5. UFSAR, Chapter 15.
6. Regulatory Guide 1.93, Rev. 0.
7. Generic Letter 84-15.
8. 10 CFR 50, Appendix A, GDC 18.
9. Regulatory Guide 1.108, Rev. 1.
10. Regulatory Guide 1.137, Rev. 1.

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BASES (continued)

REFERENCES (continued)

11. ANSI C84.1-1982.

12. ASME, Boiler and Pressure Vessel Code, Section XI.

13. IEEE Standard 308-1978.

14. Draft Regulatory Guide DG-1021, April 1992.

15. 10 CFR 50.63(a)(3)(ii) as published in Federal Register Vol. 57, No. 77 page 14517, April 21, 1992.

16. Information Notice 91-13, "INADEQUATE TESTING OF EMERGENCY DIESEL GENERATORS (EGDs)".

17. Letter from SCE to the NRC dated May 5, 1995, subject Docket Nos. 50-361 and 50-362, Diesel Generator Loading San Onofre Nuclear Generating Station Units 2 and 3.

18. Letter from the NRC to SCE dated May 12, 1999, subject Technical Specification Interpretation (TAC Nos. MA0232 and MA0233).

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