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Marked-Up Pages from the Technical Specifications

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AC Sources-Operating 3.8.1

 SR 3.8.1.3 DG loadings may include gradual loading as recommended by the manufacturer. Momentary transients outside the load range do not invalidate this test. This Surveillance shall be conducted on only one DG at a time. 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. SR 3.8.1.4 Verify each day tank contains ≥ 385 gal of fuel oil for DG 1A and DG 1B and ≥ 240 gal for DG 1C. SR 3.8.1.5 Check for and remove accumulated water from 31 of each day tank 	FREQUENCY
 Momentary transients outside the load range do not invalidate this test. This Surveillance shall be conducted on only one DG at a time. 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 operates for ≥ 60 minutes at a load ≥ 3869 kW for DG 1A, ≥ 3875 kW for DG 1B, and ≥ 2200 kW for DG 1C. SR 3.8.1.4 Verify each day tank contains ≥ 385 gal of fuel oil for DG 1A and DG 1B and ≥ 240 gal for DG 1C. SR 3.8.1.5 Check for and remove accumulated water from each day tank 	-
 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. 3482 Verify each DG operates for ≥ 60 minutes at a load ≥ (3869) kW for DG 1A, ≥ 6875) kW for DG 1B, and ≥ (200) kW for DG 1C. SR 3.8.1.4 Verify each day tank contains ≥ 385 gal of fuel oil for DG 1A and DG 1B and ≥ 240 gal for DG 1C. SR 3.8.1.5 Check for and remove accumulated water from 31 of each day tank 	
 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. 3482 Verify each DG operates for ≥ 60 minutes at a load ≥ 3869 kW for DG 1A, ≥ 3875 kW for DG 1B, and ≥ 2200 kW for DG 1C. SR 3.8.1.4 Verify each day tank contains ≥ 385 gal of fuel oil for DG 1A and DG 1B and ≥ 240 gal for DG 1C. SR 3.8.1.5 Check for and remove accumulated water from 31 ceach day tank 	
3482 Verify each DG operates for ≥ 60 minutes at a Toad ≥ 3869 kW for DG 1A, ≥ 6875 kW for DG 1B, and ≥ 6200 kW for DG 1C. As Tab DG 1B, and ≥ 6200 kW for DG 1A, ≥ 6875 kW for DG 1B, and ≥ 6200 kW for DG 1C. SR 3.8.1.4 Verify each day tank contains ≥ 385 gal of fuel oil for DG 1A and DG 1B and ≥ 240 gal for DG 1C. SR 3.8.1.4 Verify each day tank contains ≥ 385 gal of fuel oil for DG 1A and DG 1B and ≥ 240 gal for DG 1C. SR 3.8.1.5 Check for and remove accumulated water from 31 contains	
SR 3.8.1.4Verify each day tank contains \geq 385 gal of fuel oil for DG 1A and DG 1B and \geq 240 gal31 ofor DG 1C.SR 3.8.1.5Check for and remove accumulated water from each day tank31 o	specified in le 3.8.1-1
SR 3.8.1.5 Check for and remove accumulated water from 31 of each day tank	days
and any built.	days
SR 3.8.1.6 Verify the fuel oil transfer system operates to automatically transfer fuel oil from the storage tank to the day tank.	days

SURVEILLANCE REQUIREMENTS (continued)

(continued)

Amendment No. 95

SURVEILLANCE REQUIREMENTS (continued)

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	SURVEILLANCE	FREQUENCY
SR 3.8.1.10	NOTE	-
34	Verify each DG operating at a power factor ≤ 0.9 does not trip and voltage is maintained ≤ 5000 V for DG 1A and DG 1B and ≤ 5824 V for DG 1C during and following a load rejection of a load ≥ 3869 kW for DG 1A, ≥ 3875 kW for DG 1B, and $\geq (2200)$ kW for DG 1C. (980)	18 months 3482

(continued)

AC Sources-Operating 3.8.1

SURVEILLANCE REQUIREMENTS (continued)

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	SURVEILLANCE	FREQUENCY
SR 3.8.1.14	 Momentary transients outside the load and power factor ranges do not invalidate this test. 	-
	 This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR. 	
	Verify each DG operating at a power factor ≤ 0.9 operates for ≥ 24 hours:	18 months
4069	a. For ≥ 2 hours loaded ≥ 4256 kW for DG 1A, ≥ 4263 kW for DG 1B, and $\ge (2420)$ kW for DG 1C; and	2310
3482)-	b. For the remaining hours of the test loaded $\ge (3869)$ kW for DG 1A, $\ge (3875)$ kW for DG 1B, and $\ge (2200)$ kW for DG 1C.	3488
8 3.8.1.15	 This Surveillance shall be performed within 5 minutes of shutting down the DG after the DG has operated > (1 hour) 	2 hours
(3182)	for DG 1B, and $\geq (200)$ kW for DG 1A, $\geq (3875)$ kW for DG 1C. Momentary transients outside of the load range do not invalidate this test.	3488)
	 Ail DG starts may be preceded by an engine prelube period. 	
	Verify each DG starts and achieves, in ≤ 12 seconds, voltage ≥ 3870 V and ≤ 4580 V and frequency ≥ 58.8 Hz and ≤ 61.2 Hz.	18 months

(continued)

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Amendment No. 110

Attachment 4 to U-603030 LS-98-003 Page 1 of 8

Attached Marked-Up Pages of the Technical Specification Bases

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AC Sources-Operating B 3.8.1

BASES (continued)

SURVEILLANCE The AC sources are designed to permit inspection and REQUIREMENTS testing of all important areas and features, especially those that have a standby function, in accordance with 10 CFR 50, GDC 18 (Ref. 8). Periodic component tests are supplemented by extensive functional tests during refueling outages under simulated accident conditions. The SRs for demonstrating the OPERABILITY of the DGs are in accordance a with the recommendations of Regulatory Guide 1.9 (Ref. 3) Regulatory Guide 1. 08 (Ref. 9), and Regulatory Guide 1.137 (Ref. 10). (Refs. 3 and 15) Where the SRs discussed herein specify voltage and frequency tolerances, the minimum and maximum steady state output voltages of 3870 V and 4580 V respectively, are equal to - 7% and + 10% of the nominal 4160 V output voltage. The

specified minimum and maximum frequencies of the DG is 58.8 Hz and 61.2 Hz, respectively, are equal to \pm 2% of the 60 Hz nominal frequency. The specified steady state voltage and frequency ranges are derived from the recommendations given in Regulatory Guide 1.9 (Ref. 3). However, the minimum voltage was increased to ensure adequate voltage to operate all safety-related loads during a DBA (Ref. 14).

SR 3.8.1.1

This SR ensures proper circuit continuity for the offsite AC electrical power supply to the onsite distribution network and availability of offsite AC electrical power. The breaker alignment verifies that each breaker is in its correct position to ensure that distribution buses and loads are connected to their preferred power source and that appropriate independence of offsite circuits is maintained. The 7 day Frequency is adequate since breaker position is not likely to change without the operator being aware of it and because its status is displayed in the control room.

SR 3.8.1.2 and SR 3.8.1.7

These SRs help to ensure the availability of the standby electrical power supply to mitigate DBAs and transients and maintain the unit in a safe shutdown condition.

(continued)

Revision No. 2-11

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recommendations	W
of Regulatory	<u>S</u>
Guide 1.9, Revision	T
3 10-5 15 14:01	S
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surveillance is	m
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DG load equal to	٨
or a reater than 1	t
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its continuous /	1
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BASES

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<u>SR 3.8.1.2 and SR 3.8.1.7</u> (continued)

The normal 31 day Frequency for SR 3.8.1.2 (see Table 3.8.1-1, "Diesel Generator Test Schedule") is consistent with the industry guidelines for assessment of diesel generator performance (Ref. 12). The 184 day Frequency for SR 3.8.1.7 is a reduction in cold testing consistent with Generic Letter 84-15 (Ref. 7). These Frequencies provide adequate assurance of DG OPERABILITY, while minimizing degradation resulting from testing.

<u>SR 3.8.1.3</u>

This Surveillance demonstrates that the DGs are capable of synchronizing and accepting greater than or equal to the equivalent of the maximum expected accident loads. 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 DG is normally operated at a power factor between 0.8 lagging and 1.0. The 0.8 value is the design rating of the machine, while 1.0 is an operational limitation to ensure circulating currents are minimized.

The normal 31 day Frequency for this Surveillance (see Table 3.8.1-1) is consistent with the industry guidelines for assessment of diesel generator performance (Ref. 12).

Note 1 modifies this Surveillance to indicate 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 modifies this Surveillance by stating that momentary transients because of changing bus loads do not invalidate this test.

Note 3 indicates that this Surveillance shall 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 a prerequisite requirement for performance of this SR. A successful DG start must precede this test to credit satisfactory performance.

(continued)

Revision No. 1-1

BASES

However,

of Regulatory

3 (Ref. 15), this

surveillance is

performed with

to or greater than 90 percent

of its continuous

rating.

a DG load equal

consistent with the

recommendations

Guide 1.9, Revision

SURVEILLANCE REQUIREMENTS

SR 3.8.1.9 (continued)

electrical distribution systems that could challenge continued steady state operation and, as a result, plant safety systems. Credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include:

- Unexpected operational events which cause the equipment to perform the function specified by this Surveillance, for which adequate documentation of the required performance is available; and
- Post maintenance testing that requires performance of this Surveillance in order to restore the component to OPERABLE, provided the maintenance was required, or performed in conjunction with maintenance required to maintain OPERABILITY or reliability.

In order to ensure that the DG is tested under load conditions that are as close to design basis conditions as possible, Note 2 requires that, if synchronized to offsite power, testing be performed using a power factor ≤ 0.9 . This power factor is chosen to be representative of the actual design basis inductive loading that the DG could experience.

A Break

SR 3.8.1.10

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

(continued)

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Revision No. 0

BASES	
SURVEILLANCE REQUIREMENTS	<u>SR 3.8.1.13</u> (continued) The SR is modified by a Note. The reason for the Note is that performing the Surveillance removes a required DC from
	 service. Credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include: 1) Unexpected operational events which cause the equipment to perform the function specified by this Surveillance, for which adequate documentation of the required performance is available; and
be loaded val to or eater than 105 cent of the	 Post maintenance testing that requires performance of this Surveillance in order to restore the component to OPERABLE, provided the maintenance was required, or performed in conjunction with maintenance required to maintain OPERABILITY or reliability. SR 3.8.1.14 (1.9, Revision 3 (Ref. 15))
at least 2 rs and equal	Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(3), requires demonstration once per 18 months that the DGs can start and run continuously at (full load)capability for an interval of not less than 24 hours 22 hours of which is at a load
or greater (o 90 percent) he continuous ng for the	of which is at a load equivalent to 110% of the Continuous duty rating of the DG. The DG starts for this Surveillance can be performed either from standby or hot conditions. The provisions for prelube 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.
hours) f. 15).	In order to ensure that the DG is tested under load conditions that are as close to design conditions as possible, testing must be performed using a power factor ≤ 0.9 . This power factor is chosen to be representative of the actual design basis inductive loading that the DG could experience.
2	The 18 month Frequency is consistent with the recommendations of Regulatory Guide (1.102 [Ref. 9],) paragraph 2.a. (3); takes into consideration plant conditions required to perform the Surveillance; and is intended to be consistent with expected fuel cycle lengths.
	(continued)

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BASES

Revision No. 3-1

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2 hours

BASES

SURVEILLANCE

REQUIREMENTS

<u>SR 3.8.1.14</u> (continued)

This Surveillance is modified by two Notes. Note 1 states that momentary transients due to changing bus loads do not invalidate this test. Similarly, momentary power factor transients above the limit do not invalidate the test. The reason for Note 2 is that during operation with the reactor critical, performance of this SR could cause perturbations to the electrical distribution systems that would challenge continued steady state operation and, as a result, plant safety systems. Credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include:

- Unexpected operational events which cause the equipment to perform the function specified by this Surveillance, for which adequate documentation of the required performance is available; and
- 2) Post maintenance testing that requires performance of this Surveillance in order to restore the component to OPERABLE, provided the maintenance was required, or performed in conjunction with maintenance required to maintain OPERABILITY or reliability.

SR 3.8.1.15

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 12 seconds. The 12 second time is derived from the requirements of the accident analysis to respond to a design basis large break LOCA. The DG's ability to maintain the required voltage and frequency is tested by those SRs which require DG loading.

The 18 month Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(5).

This SR has been modified by two Notes. Note 1 ensures that the test is performed with the diesel sufficiently hot. The requirement that the diesel has operated for at least hour at full load conditions prior to performance of this

(continued) (i.e., equal to or greater than 90 percent of the continuous rating) Revision No. 3-1

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AC Sources-Operating B 3.8.1 nis page included for continuity.

SURVEILLANCE REQUIREMENTS

BASES

SR 3.8.1.15 (continued)

Surveillance is based on manufacturer recommendations for achieving hot conditions. Momentary transients due to changing bus loads 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 1.108 (Ref. 9), paragraph 2.a.(6), this Surveillance ensures that the manual synchronization and load transfer from the DG to each offsite power source can be made and that the DG can be returned to ready-to-load status when offsite power is restored. It also ensures that the undervoltage logic is reset to allow the DG to reload if a subsequent loss of offsite power occurs. The DG is considered to be in ready-to-load status when the DG is at rated speed and voltage, the output breaker is open and can receive an auto-close signal on bus undervoltage, and the load sequence timers are reset.

Portions of the synchronization circuit are associated with the DG and portions with the offsite circuit. If a failure in the synchronization requirement of the Surveillance occurs, depending on the specific affected portion of the synchronization circuit, either the DG or the associated offsite circuit is declared inoperable.

The Frequency of 18 months is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(6), and takes into consideration plant conditions required to perform the Surveillance.

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

(continued)

AC Sources-Operating B 3.8.1

SURVEILLANCE REQUIREMENTS	Diesel Generator Test Schedule (continued) A test interval in excess of 7 days (or 31 days, as appropriate) constitutes a failure to meet SRs and results in the associated DG being declared inoperable. It does not, however, constitute a valid test or failure of the DG, and any consecutive test count is not reset.
REFERENCES	1. 10 CFR 50, Appendix A, GDC 17.
	2. USAR, Chapter 8.
	3. Regulatory Guide 1.9.
	4. USAR, Chapter 6. (? Revision 2)
	5. USAR, Chapter 15.
	6. Regulatory Guide 1.93.
	7. Generic Letter 84-15, July 2, 1984.
	8. 10 CFR 50, Appendix A, GDC 18.
	9. Regulatory Guide 1.108.
	10. Regulatory Guide 1.137.
	11. ANSI C84.1, 1982.
	12. NUMARC 87-00. Revision 1, August 1991.
	13. IEEE Standard 3C8.
-	14. IP Calculation 19-AN-19.

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