

ATTACHMENT B

MARKED-UP TECHNICAL SPECIFICATIONS

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TABLE 3.3-4 (Continued)

ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	TRIP SETPOINT	ALLOWABLE VALUES
7. Loss of Power (4.16 kV Emergency Bus Undervoltage)		
a. First Level		
1) Diesel Start	> 0 volts with a ≤ 0.8 second time delay and > 2583 volts with a ≤ 10 second time delay	> 0 volts with a ≤ 0.8 second time delay and > 2583 volts with a ≤ 10 second time delay
2) Initiation of Load Shed	One relay > 0 volts with a ≤ 4 second time delay and > 2583 volts with a ≤ 25 second time delay with one relay > 2870 volts, instantaneous	One relay > 0 volts with a ≤ 4 second time delay and > 2583 volts with a ≤ 25 second time delay with one relay > 2870 volts, instantaneous
b. Second Level		
1) Diesel Start	> 2500 volts with a ≤ 10 second time delay	> 2500 volts with a ≤ 10 second time delay
2) Initiation of Load Shed	> 2500 volts with a ≤ 20 second time delay	> 2500 volts with a ≤ 20 second time delay
8. Engineered Safety Features Actuation System Interlocks		
a. Pressurizer Pressure, P-11	≤ 1915 psig	≤ 1925 psig
b. Low-Low T_{avg} , P-12	increasing 543°F decreasing 543°F	≤ 545.8°F ≥ 540.2°F
c. Reactor Trip, P-4	N.A.	N.A.

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Amendment Nos. 37 & 38, 72 & 73
August 6, 1992

DIABLO CANYON - UNITS 1 & 2

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ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS

4.8.1.1.1 Each of the above required independent circuits between the offsite transmission network and the Onsite Class 1E Distribution System shall be:

- a. Determined OPERABLE at least once per 7 days by verifying correct breaker alignments, indicated power availability, and
- b. Demonstrated OPERABLE at least once per 18 months during shutdown by:
 - 1) Transferring 4 kV vital bus power supply from the normal circuit to the alternate circuit (manually and automatically) and to the delayed access circuit (manually), and
 - 2) Verifying that on a Safety Injection test signal, without loss of offsite power, the preferred, immediate access offsite power source energizes the emergency busses with permanently connected loads and energizes the auto-connected emergency (accident) loads through sequencing timers.

4.8.1.1.2 Each diesel generator* shall be demonstrated OPERABLE:

- a. In accordance with the frequency specified in Table 4.8-1 on a STAGGERED TEST BASIS by:**

4160 +240/-375

 - 1) Verifying the fuel level in the engine-mounted fuel tank,
 - 2) Verifying the diesel starts from ambient condition and accelerates to at least 900 rpm in less than or equal to 10 seconds. The generator voltage and frequency shall be ~~4160 ± 420~~ volts and 60 ± 1.2 Hz within 13 seconds after the start signal. The diesel generator shall be started for this test by using one of the following signals:
 - a) Manual, or
 - b) Simulated loss of offsite power by itself (Startup bus undervoltage), or
 - c) A Safety Injection actuation test signal by itself.

*For a five diesel generator configuration, tests of Diesel Generator 3 to satisfy the frequency specified in Table 4.8-1 and in Surveillance Requirement 4.8.1.1.2b for one unit may be counted in determining whether the frequency specified in Table 4.8-1 and in Surveillance Requirement 4.8.1.1.2b for the other unit is satisfied. Unit-specific portions of this Surveillance Requirement for Diesel Generator 3 shall be performed on an alternating schedule with signals from Units 1 and 2.

**All diesel generator starts for the purpose of this surveillance test may be preceded by an engine prelube period. Further, all surveillance tests, with the exception of once per 184 days, may also be preceded by warmup procedures (e.g., gradual acceleration and/or gradual loading > 150 sec) as recommended by the manufacturer so that the mechanical stress and wear on the diesel engine is minimized.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- 3) Verifying the generator is synchronized, loaded to greater than or equal to 2484 kW in less than or equal to 60 seconds, and operates for greater than or equal to 60 minutes,
- 4) Verifying the diesel generator is aligned to provide standby power to the associated emergency busses,* and
- 5) Verifying the diesel engine protective relay trip cutout switch is returned to the cutout position following each diesel generator test.

b. At least once per 18 months during shutdown**, by:

- 1) Subjecting the diesel to an inspection in accordance with procedures prepared in conjunction with its manufacturer's recommendations for this class of standby service;
- 2) Verifying that the load sequence timers are OPERABLE with each load sequence timer within the limits specified in Table 4.8-2;
- 3) Verifying the generator capability to reject a load of greater than or equal to 508 kW while maintaining voltage at ~~4160 ± 420~~ volts and frequency at 60 ± 3 Hz; *4160 +240/-375*
- 4) Verifying the generator capability to reject a load of greater than or equal to 2484 kW without tripping. The generator voltage shall not exceed 4580 volts during and following the load rejection;
- 5) Simulating a loss of offsite power by itself, and:
 - a) Verifying de-energization of the emergency busses and load shedding from the emergency busses, and
 - b) Verifying the diesel starts on the auto-start signal, energizes the emergency busses with permanently connected loads within 10 seconds, energizes the required auto-connected loads through sequencing timers and operates for greater than or equal to 5 minutes while its generator is loaded with the permanent and auto-connected loads. After energization of these loads, the steady state voltage and frequency of the emergency busses shall be maintained at ~~4160 ± 420~~ volts and 60 ± 1.2 Hz during this test. *4160 +240/-375*

*For a five diesel generator configuration, this may be the associated bus in the other unit if that unit is in MODE 1, 2, 3 or 4.

**For a five diesel generator configuration, these surveillance requirements can be performed on the third (common) diesel generator with only one unit shutdown.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- 4/160 + 240/-375
- 6) - Verifying that on a Safety Injection test signal without loss of offsite power, the diesel generator starts on the auto-start signal and operates on standby for greater than or equal to 5 minutes. The generator voltage and frequency shall be ~~4160 ± 420~~ volts and 60 ± 1.2 Hz within 13 seconds after the auto-start signal; the steady state generator voltage and frequency shall be maintained within these limits during this test;
- 7) Simulating a loss of offsite power in conjunction with a Safety Injection test signal, and:
- a) Verifying de-energization of the emergency busses and load shedding from the emergency busses;
 - b) Verifying the diesel starts on the auto-start signal, energizes the emergency busses with permanently connected loads within 10 seconds, energizes the auto-connected emergency (accident) loads through sequencing timers and operates for greater than or equal to 5 minutes while its generator is loaded with the emergency loads. After energization of these loads, the steady state voltage and frequency of the emergency busses shall be maintained at ~~4160 ± 420~~ volts and 60 ± 1.2 Hz during this test; and
 - c) Verifying that all automatic diesel generator trips, except engine overspeed, low lube oil pressure and generator differential, are bypassed when the diesel engine trip cutout switch is in the cutout position and the diesel is aligned for automatic operation.
- 4/160 + 240/-375
- 8) Verifying the diesel generator operates for at least 24 hours. During the first 2 hours of this test, the diesel generator shall be loaded to greater than or equal to 2750 kW and during the remaining 22 hours of this test, the diesel generator shall be loaded to greater than or equal to 2484 kW. The generator voltage and frequency shall be ~~4160 ± 420~~ volts and 60 ± 1.2 Hz within 13 seconds after the start signal; the steady state generator voltage and frequency shall be maintained within these limits during this test. Within 5 minutes after completing this 24 hour test, perform Specification 4.8.1.1.2b.5b);*
- 4/160 + 240/-375
- 9) Verifying that the auto-connected loads to each diesel generator do not exceed the maximum rating of 2750 kW;
- 10) Verifying the diesel generator's capability to:

*If Specification 4.8.1.1.2b.5b) is not satisfactorily completed, it is not necessary to repeat the preceding 24-hour test. Instead the diesel generator may be operated at 2484 kW for 1 hour or until operating temperature has stabilized.

INSTRUMENTATION

BASES

REACTOR PROTECTION SYSTEM and ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION (Continued)

assumed not to occur until the VCT charging pump suction isolation valves are closed following opening of the RWST charging pump suction isolation valves. When the sequential operation of the RWST and VCT valves is not included in the response times (Table Notation 7), the values specified are based on the LOCA analyses. The LOCA analyses takes credit for injection flow regardless of the source. Verification of the response times specified in Table 3.3-5 will assure that the assumptions used for the LOCA and non-LOCA analyses with respect to the operation of the VCT and RWST valves are valid.

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ELECTRICAL POWER SYSTEMS

BASES

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

Guides 1.9, "Selection of Diesel Generator Set Capacity for Standby Power Supplies," March 10, 1971, 1.108, "Periodic Testing of Diesel Generator Units Used as Onsite Electric Power Systems at Nuclear Power Plants," Revision 1, August 1977, where applicable, and 1.137 "Fuel Oil Systems for Standby Diesel Generators," Revision 1, October 1979, where applicable. For the five diesel generator configuration, the third (common) diesel generator is designed to respond to a Safety Injection Signal from either Unit 1 or Unit 2. If the capability to respond to a Safety Injection Signal from one unit is maintained during surveillance testing on the other unit, then the third (common) diesel generator shall be considered to be OPERABLE for that unit.

Insert B →

The Surveillance Requirements for demonstrating the OPERABILITY of the batteries are based on the recommendations of Regulatory Guide 1.129, "Maintenance Testing and Replacement of Large Lead Storage Batteries for Nuclear Power Plants," February 1978, and IEEE Std 450-1980, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Large Lead Storage Batteries for Generating Stations and Substations."

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

Table 4.8-3 specifies the normal limits for each designated pilot cell and each connected cell for electrolyte level, float voltage and specific gravity. The limits for the designated pilot cells float voltage and specific gravity, greater than 2.13 volts and 0.015 below the manufacturer's full charge specific gravity or a battery charger current that had stabilized at a low value, is characteristic of a charged cell with adequate capacity. The normal limits for each connected cell for float voltage and specific gravity, greater than 2.13 volts and not more than 0.020 below the manufacturer's full charge specific gravity with an average specific gravity of all the connected cells not more than 0.010 below the manufacturer's full charge specific gravity, ensures the OPERABILITY and capability of the battery.

Operation with a battery cell's parameter outside the normal limit but within the allowable value specified in Table 4.8-3 is permitted for up to 7 days. During this 7-day period: (1) the allowable values for electrolyte level ensures no physical damage to the plates with an adequate electron transfer capability; (2) the allowable value for the average specific gravity of all the cells, not more than 0.020 below the manufacturer's recommended full charge specific gravity ensures that the decrease in rating will be less than the safety margin provided in sizing; (3) the allowable value for an individual cell's specific gravity ensures that an individual cell's specific gravity



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Undervoltage protection will generate a loss of power diesel generator start in the event a loss of voltage or degraded voltage condition occurs. The diesel generators provide a source of emergency power when offsite power is either unavailable or is insufficiently stable to allow safe unit operation. The first level undervoltage relays (FLURs) detect the loss of bus voltage (less than 69% bus voltage). The second level undervoltage relays (SLURs) provide a second level of undervoltage protection which protects all Class 1E loads from short or long term degradation in the offsite power system. The SLUR allowable value is the minimum steady state voltage needed on the 4160 volt vital bus to ensure adequate voltage is available for safety related equipment at the 4160 volt, 480 volt, and 120 volt levels.

The steady state voltage and frequency Surveillance Requirements for demonstrating the OPERABILITY of the diesel generators are consistent with the second level undervoltage relay allowable values. This is the minimum steady state voltage needed on the 4160 volt vital buses to ensure adequate 4160 volt, 480 volt and 120 volt levels. The maximum steady state output voltage of 4400 V is the maximum operating voltage for 4000 V motors specified in ANSI C84.1. The maximum steady state output voltage of 4400 V ensures that for a lightly loaded distribution system, the voltage at the terminals of 4000 V motors is no more than the maximum rated operating voltages. The specified minimum and maximum frequencies of the DG are 58.8 Hz and 61.2 Hz, respectively. These values are equal to $\pm 2\%$ of the 60 Hz nominal frequency and are derived from the recommendations given in Regulatory Guide 1.9.

