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PG&E Letter DCL-14-018

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555-0001

10 CFR 50.90

Diablo Canyon Units 1 and 2
Docket No. 50-275, OL-DPR-80
Docket No. 50-323, OL-DPR-82
License Amendment Request 14-01
Revision to Technical Specification 3.8.1, "AC Sources - Operating"

Dear Commissioners and Staff:

Pursuant to 10 CFR 50.90, Pacific Gas and Electric Company (PG&E) hereby requests approval of the enclosed proposed amendment to Facility Operating License Nos. DPR-80 and DPR-82 for Units 1 and 2, respectively, of the Diablo Canyon Power Plant.

The proposed amendment modifies Technical Specification 3.8.1, "AC Sources - Operating," for Diesel Generator (DG) testing to:

(1) Revise Surveillance Requirements (SRs) 3.8.1.2, 3.8.1.7, 3.8.1.11, 3.8.1.12, 3.8.1.15, 3.8.1.19, and 3.8.1.20 to change the allowable steady state DG operating voltage and frequency bands;
(2) Revise SR 3.8.1.3 to change the DG test loading criterion;
(3) Add verification of DG cooling system function for SRs 3.8.1.3 and 3.8.1.14, respectively;
(4) Revise SR 3.8.1.4 to change the DG day tank surveillance requirement minimum volume;
(5) Revise SR 3.8.1.9 to revise the voltage and frequency recovery timing requirement;
(6) Revise SR 3.8.1.10 to change the DG full-load rejection test loading criterion and voltage limit;
(7) Revise SR 3.8.1.14 to change the DG 24-hour test loading criteria;
(8) Revise SR 3.8.1.15 to change the DG test prerequisite loading criterion; and
(9) Add a new note to SRs 3.8.1.10 and 3.8.1.14 to reduce the SR minimum DG operating power factor (PF) with the stipulation that PF limit requirements are not required if grid conditions do not permit.

Relating to SR 3.8.1.14, PG&E requests an exception to Regulatory Guide 1.108, Revision 1, Regulatory Position C.2.a.(3), which states that the DG must demonstrate full-load-carrying capability for an interval of not less than 24 hours, of which 22 hours should be at a load equivalent to the continuous rating of the DG and 2 hours should be at a load equivalent to the 2-hour rating of the DG. PG&E proposes a test loading value of 2860 kW (nominal) for the 2-hour portion of SR 3.8.1.14, which is the DG 2-hour rating less instrument uncertainty, a test band, and any DG derating required due to ambient conditions at the time of the test.

The proposed amendment is submitted to address non-conservative Technical Specification surveillance requirements 3.8.1.2, 3.8.1.3, 3.8.1.4, 3.8.1.7, 3.8.1.9, 3.8.1.10, 3.8.1.11, 3.8.1.12, 3.8.1.14, 3.8.1.15, 3.8.1.19, and 3.8.1.20 in accordance with Nuclear Regulatory Commission (NRC) Administrative Letter 98-10, "Dispositioning of Technical Specifications That Are Insufficient to Assure Plant Safety," dated December 29, 1998.

The proposed amendment was discussed with the NRC staff at public meetings on August 7, 2012, January 15, 2013, and September 24, 2013.

PG&E requests approval of this License Amendment request no later than March 27, 2015. PG&E requests the License Amendment be made effective upon NRC issuance, to be implemented within 180 days from the date of issuance.

The enclosure to this letter contains the evaluation of the proposed changes.

This letter contains a regulatory commitment (as defined by NEI 99-04), which is contained in Attachment 5 of the Enclosure. Additional guidance will be provided in the surveillance procedures as part of implementation of the License Amendment to provide guidance to the operators on use of the new note added to SR 3.8.1.10 and to SR 3.8.1.14.

Pursuant to 10 CFR 50.91, PG&E is sending a copy of this proposed amendment to the California Department of Public Health.

If you have any questions or require additional information, please contact Mr. Tom Baldwin at 805-545-4720.

I have been delegated the authority of Barry S. Allen, Site Vice President, during his absence. I state under penalty of perjury that the forgoing is true and correct.

Executed on March 27, 2014.

Sincerely,

Jeffrey S. Summy
Senior Director Engineering and Technical Services

kjse/4328 SAPN 50307101

Enclosure
cc: Diablo Distribution
cc/enc: Peter J. Bamford, NRR Project Manager
Marc L. Dapas, NRC Region IV Administrator
Thomas R. Hipschman, NRC Senior Resident Inspector
Gonzalo L. Perez, Branch Chief, California Department of Public Health

License Amendment Request 14-01
Revision to Technical Specification 3.8.1, "AC Sources - Operating"

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ATTACHMENTS:

1. Technical Specification Pages Markups (7 Pages)
2. Retyped Technical Specification Pages (9 Pages)
3. Technical Specification Bases Pages Markups - For Information Only (26 Pages)
4. UFSAR Update Markup - For Information Only (22 Pages)
5. Regulatory Commitments (1 Page)
6. Comparison of Diesel Generator Testing Requirements in Regulatory Guide 1.108, Revision 1 to Regulatory Guide 1.9, Revision 3 - For Information Only (7 Pages)
7. List of Previous License Amendments affecting Technical Specifications 3/4.8.1 - For Information Only (3 Pages)

1. SUMMARY DESCRIPTION

This submittal is a request to amend Operating Licenses DPR-80 and DPR-82 for Diablo Canyon Power Plant (DCPP), Units 1 and 2, respectively.

Pursuant to 10 CFR 50.90, Pacific Gas & Electric (PG&E) hereby requests approval of this proposed amendment to Facility Operating License Nos. DPR-80 and DPR-82 for DCPP, Units 1 and 2, respectively. The proposed amendment is submitted to address non-conservative Technical Specification (TS) values in accordance with Nuclear Regulatory Commission (NRC) Administrative Letter 98-10, "Dispositioning of Technical Specifications That Are Insufficient to Assure Plant Safety," dated December 29, 1998.

In summary, the proposed amendment will change TS 3.8.1 to:

1. Revise Surveillance Requirements (SRs) 3.8.1.2, 3.8.1.7, 3.8.1.11, 3.8.1.12, 3.8.1.15, 3.8.1.19 and 3.8.1.20 to change the allowable steady state Diesel Generator (DG) operating voltage and frequency bands:
   - from greater than or equal to 58.8 Hz and less than or equal to 61.2 Hz ***to*** greater than or equal to 59.2 Hz and less than or equal to 60.8 Hz
   - from greater than or equal to 3785 V and less than or equal to 4400 V ***to*** greater than or equal to 3980 V and less than or equal to 4340 V
2. Revise the SR 3.8.1.3 DG test load band values from greater than or equal to 2340 and less than or equal to 2600 kW ***to*** 2860 kW (nominal) for the 1-hour test interval to satisfy Regulatory Guide (RG) 1.108, Revision 1 (Reference 1), Regulatory Position (RP) C.2.c.(2).
3. Add verification of DG cooling system function to satisfy RG 1.108, Revision 1, RPs C.2.c.(2) and C.2.a.(3) for SRs 3.8.1.3 and 3.8.1.14, respectively.
4. Revise SR 3.8.1.4 to change the DG day tank surveillance requirement minimum volume from greater than or equal to 250 gal. of fuel oil ***to*** a usable volume of greater than or equal to 258 gal. of fuel oil.
5. Revise the SR 3.8.1.9 time requirement for voltage and frequency recovery following rejection of the largest single load from 2.4 seconds ***to*** 1.6 seconds to comply with Safety Guide 9, March 1971 (Reference 2).
6. Revise the SR 3.8.1.10 DG test load band values from greater than or equal to 2340 and less than or equal to 2600 kW ***to*** 2860 kW (nominal) for the load rejection test to address RG 1.108, Revision 1, RP C.2.a.(4). Also, revise the voltage limit following a load rejection from 5075 V ***to*** 5096 V.
7. Revise the DG test load band values for SR 3.8.1.14 to address RG 1.108, Revision 1, RP C.2.a.(3):
   - from greater than or equal to 2600 kW and less than or equal to 2860 kW ***to*** 2860 kW (nominal) for the 2-hour of 24-hour endurance test.
   - from greater than or equal to 2340 kW and less than or equal to 2600 kW ***to*** 2750 kW (nominal) for the 22-hour of 24-hour endurance test.
8. Revise SR 3.8.1.15 to change the DG test prerequisite loading criterion from greater than or equal to 2340 kW and less than or equal to 2600 kW ***to*** 2750 kW (nominal).

9. Add a new note to reduce the SR minimum DG operating power factor (PF) from less than or equal to 0.87 ***to*** less than or equal to 0.84 with the stipulation that PF limit requirements are not required if grid conditions do not permit, but under this condition, the PF shall be maintained as close to 0.84 as practicable (SRs 3.8.1.10 and 3.8.1.14).

In addition to the TS 3.8.1 changes, an exception to RG 1.108, Revision 1 is requested:

- Request an exception to RG 1.108, Revision 1 (R1), RP C.2.a.(3) to revise the DG test load values from greater than or equal to 2600 and less than or equal to 2860 kW ***to*** 2860 kW (nominal) for the 2-hour portion of SR 3.8.1.14. Nominal is defined as the SR load value less instrument uncertainty, a test band, and any engine derating required due to ambient conditions at the time of the test. Since the proposed test load value for the 2-hour portion of SR 3.8.1.14 is less than the 2-hour rating as required by RG 1.108, R1, RP C.2.a.(3), an exception is requested.

2. DETAILED DESCRIPTION

2.1. PROPOSED AMENDMENT

The following changes are proposed to the TS:

SR 3.8.1.2 is revised from:

Verify each DG starts from standby conditions and achieves steady state voltage ≥ 3785 V and ≤ 4400 V, and frequency ≥ 58.8 Hz and ≤ 61.2 Hz.

to:

Verify each DG starts from standby conditions and achieves steady state voltage ≥ 3980 V and ≤ 4340 V, and frequency ≥ 59.2 Hz and ≤ 60.8 Hz.

SR 3.8.1.3 is revised from:

Verify each DG is synchronized and loaded and operates for ≥ 60 minutes at a load ≥ 2340 kW and ≤ 2600 kW.

to:

Verify each DG is synchronized and loaded and operates for ≥ 60 minutes at a load of 2860 kW (nominal) and DG cooling system functions within design limits.

SR 3.8.1.4 is revised from:

Verify each day tank contains ≥ 250 gal of fuel oil.

to:

Verify each day tank contains a usable volume of ≥ 258 gal of fuel oil.

SR 3.8.1.7 is revised from:

b. Steady state voltage ≥ 3785 V and ≤ 4400 V, and frequency ≥ 58.8 Hz and ≤ 61.2 Hz.

to:

b. Steady state voltage ≥ 3980 V and ≤ 4340 V, and frequency ≥ 59.2 Hz and ≤ 60.8 Hz.

SR 3.8.1.9 is revised from:

b. Within 2.4 seconds following load rejection, the voltage is ≥ 3785 V and ≤ 4400 V; and

c. Within 2.4 seconds following load rejection, the frequency is ≥ 58.8 Hz and ≤ 61.2 Hz.

to:

b. Within 1.6 seconds following load rejection, the voltage is ≥ 3785 V and ≤ 4400 V; and

c. Within 1.6 seconds following load rejection, the frequency is ≥ 58.8 Hz and ≤ 61.2 Hz.

SR 3.8.1.10 is revised from:

Verify each DG operating at a power factor ≤ 0.87 does not trip and voltage is maintained ≤ 5075 V during and following a load rejection of ≥ 2340 kW and ≤ 2600 kW.

to:

----------NOTE----------
If performed with DG synchronized with offsite power, testing shall be performed at a power factor ≤ 0.84. However, if grid conditions do not permit, the power factor limit is not required to be met. Under this condition, the power factor shall be maintained as close to the limit as practicable.

Verify each DG does not trip and voltage is maintained ≤ 5096 V during and following a load rejection of 2860 kW (nominal).

SR 3.8.1.11 is revised from:

c.3. maintains steady state voltage ≥ 3785 V and ≤ 4400 V

c.4. maintains steady state frequency ≥ 58.8 Hz and ≤ 61.2 Hz; and

to:

c.3. maintains steady state voltage ≥ 3980 V and ≤ 4340 V

c.4. maintains steady state frequency ≥ 59.2 Hz and ≤ 60.8 Hz; and

SR 3.8.1.12 is revised from:

b. Achieves steady state voltage ≥ 3785 V and ≤ 4400 V, and frequency ≥ 58.8 Hz and ≤ 61.2 Hz.

to:

b. Achieves steady state voltage ≥ 3980 V and ≤ 4340 V, and frequency ≥ 59.2 Hz and ≤ 60.8 Hz.

SR 3.8.1.14 is revised from:

Verify each DG operating at a power factor ≤0.87 operates for ≥ 24 hours:

a. For ≥ 2 hours loaded ≥ 2600 kW and ≤ 2860 kW; and

b. For the remaining hours of the test loaded ≥ 2340 kW and ≤ 2600 kW.

to:

Verify each DG operates for ≥ 24 hours:

a. For ≥ 2 hours loaded at 2860 kW (nominal); and

b. For the remaining hours of the test loaded at 2750 kW (nominal); and

c. Verify DG cooling system functions within design limits.

Also added a new note:

----------NOTES----------

2. If performed with DG synchronized with offsite power, testing shall be performed at a power factor ≤ 0.84. However, if grid conditions do not permit, the power factor limit is not required to be met. Under this condition, the power factor shall be maintained as close to the limit as practicable.

SR 3.8.1.15 is revised from:

----------NOTES----------

1. This Surveillance shall be performed within 5 minutes of shutting down the DG after the DG has operated ≥ 2 hours loaded ≥ 2340 kW and ≤ 2600 kW.

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to:

----------NOTES----------

1. This Surveillance shall be performed within 5 minutes of shutting down the DG after the DG has operated ≥ 2 hours loaded at 2750 kW (nominal).

And from:

b. Steady state voltage ≥ 3785 V and ≤ 4400 V, and frequency ≥ 58.8 Hz and ≤ 61.2 Hz.

to:

b. Steady state voltage ≥ 3980 V and ≤ 4340 V, and frequency ≥ 59.2 Hz and ≤ 60.8 Hz.

SR 3.8.1.19 is revised from:

c.3. achieves steady state voltage ≥ 3785 V and ≤ 4400 V

c.4. achieves steady state frequency ≥ 58.8 Hz and ≤ 61.2 Hz; and

to:

c.3. achieves steady state voltage ≥ 3980 V and ≤ 4340 V

c.4. achieves steady state frequency ≥ 59.2 Hz and ≤ 60.8 Hz; and

SR 3.8.1.20 is revised from:

b. Steady state voltage ≥ 3785 V and ≤ 4400 V, and frequency ≥ 58.8 Hz and ≤ 61.2 Hz.

to:

b. Steady state voltage ≥ 3980 V and ≤ 4340 V, and frequency ≥ 59.2 Hz and ≤ 60.8 Hz.

2.2. *REASON FOR PROPOSED AMENDMENT*

Safety Guide 9, dated March 10, 1971, RP C.1, allows DGs to be sized during the construction permit stage such that each DG set on a standby (onsite) power supply should be selected to have a continuous load rating equal to or greater than the sum of the conservatively estimated loads needed to be powered at any one time. The continuous load rating for the DGs at DCPP is 2600 kW and was established during the construction permit stage when the characteristics of loads were not accurately known. Safety Guide 9 (March 1971), RP C.2, is specific to facilities at the operating license stage of review and continues to be applicable to DCPP. Per Safety Guide 9 (March

1971), RP C.2, predicted loads should not exceed the smaller of the DG 2000-hour/year rating, or 90 percent of the 30-minute rating.

Safety Guide 9 (March 1971), states that the nominal rating, used as a datum for the overload ratings, has been termed variously the "continuous," "guaranteed," or "long term" rating. The definition used throughout Safety Guide 9 (March 1971), for "continuous rating" is "that load for which the supplier guarantees continuous operation at a high availability (expected to be about 95 percent) with an annual maintenance interval." The overload ratings are similarly defined except that the specified maintenance intervals are shorter.

During implementation of NRC Temporary Instruction 2515/176, "Emergency Diesel Generator Technical Specification Surveillance Requirements Regarding Endurance and Margin Testing," dated May 16, 2008 (Reference 3), the NRC Resident Inspector determined that loading the DGs to less than or equal to their continuous ratings using the sum of the conservatively estimated loads needed to be powered at any one time at Technical Specification maximum voltage and frequency is no longer achievable. In response to the inspectors' observations on the DG load calculations, PG&E entered the condition in the corrective action program per Notification 50179082 on January 5, 2009, performed an operability evaluation and concluded that the DGs were capable of performing their intended safety function and remained operable. To address the NRC resident inspector observations related to the implementation of NRC Temporary Instruction 2515/176, PG&E initiated a DG load study analysis to evaluate Class 1E 4160 V Engineered Safety Features (ESF) bus loading under various Design Basis Accident (DBA) scenarios. The results of the DG load study analysis showed that the current TS SR DG test load band values, steady state frequency and voltage bands, PF, and DG Day Tank surveillance requirement volume would need to be changed.

Also during the investigation, PG&E identified that the DG 30-minute rating was 3000 kW instead of 3250 kW (as documented in Updated Final Safety Analysis Report (UFSAR) Section 8.3.1.1.6.3.13). This reduced the limit on predicted loads, specified by Safety Guide 9 (March 1971), RP C.2, from 2750 kW (the 2000-hour/year rating) to 2700 kW (90 percent of the 30-minute rating).

During the August 2013 NRC Component Design Bases Inspection, the Staff identified that the impact of the combustion air inlet temperature on the vendor-specified DG rating had not been evaluated in the DG load study analysis. In addition, the available combustion air temperature for the maximum site outside air conditions was not evaluated, which could have affected the capability of safety related equipment to respond to initiating events. The proposed amendment addresses these issues.

In response to discussion at the September 24, 2013 pre-application meeting (Reference 4) for this License Amendment Request (LAR), the proposed SRs consider instrument uncertainty. A modification will reduce the instrument uncertainty for DG load measurement from approximately ± 90 kW to approximately ± 35 kW.

The proposed amendment is submitted to address non-conservative TS surveillance requirements 3.8.1.2, 3.8.1.3, 3.8.1.4, 3.8.1.7, 3.8.1.9, 3.8.1.10, 3.8.1.11, 3.8.1.12, 3.8.1.14, 3.8.1.15, 3.8.1.19 and 3.8.1.20 in accordance with NRC Administrative Letter 98-10, "Dispositioning of Technical Specifications That Are Insufficient to Assure Plant Safety," dated December 29, 1998.

3. TECHNICAL EVALUATION

3.1. Description of Onsite Alternating Current (AC) Power Systems

The electrical auxiliary power system at the DCPP is designed to provide electric power to the necessary plant electrical equipment under combinations of plant operation and electric power source availability. The various subsystems provide adequate protection for electrical equipment during fault conditions, while maintaining maximum system flexibility and reliability.

The PG&E grid, which operates at several voltage levels, provides power to the DCPP preferred power supply. The preferred power supply is comprised of two physically independent offsite power circuits, the startup offsite power circuit (230-kV) and the auxiliary offsite power circuit (500-kV). The startup offsite power circuit (230-kV system) provides an immediate source of offsite power from either of the two 230-kV transmission lines connecting to the 230-kV switchyard. The auxiliary offsite power circuit (500-kV system) provides the delayed source of offsite power from any one of the three 500-kV transmission lines connecting to the 500-kV switchyard. The DCPP Electrical Distribution one-line diagram is shown in Figure 1.

The startup offsite power circuit provides startup and standby power, and is immediately available following a loss-of-coolant accident to assure that core cooling, containment integrity, and other vital safety functions are maintained. The auxiliary offsite power circuit provides a delayed access source of preferred power supply after the main generator is disconnected following anticipated operational occurrences. A combination of the startup offsite power circuit and the auxiliary offsite power circuit provides the preferred power supply.

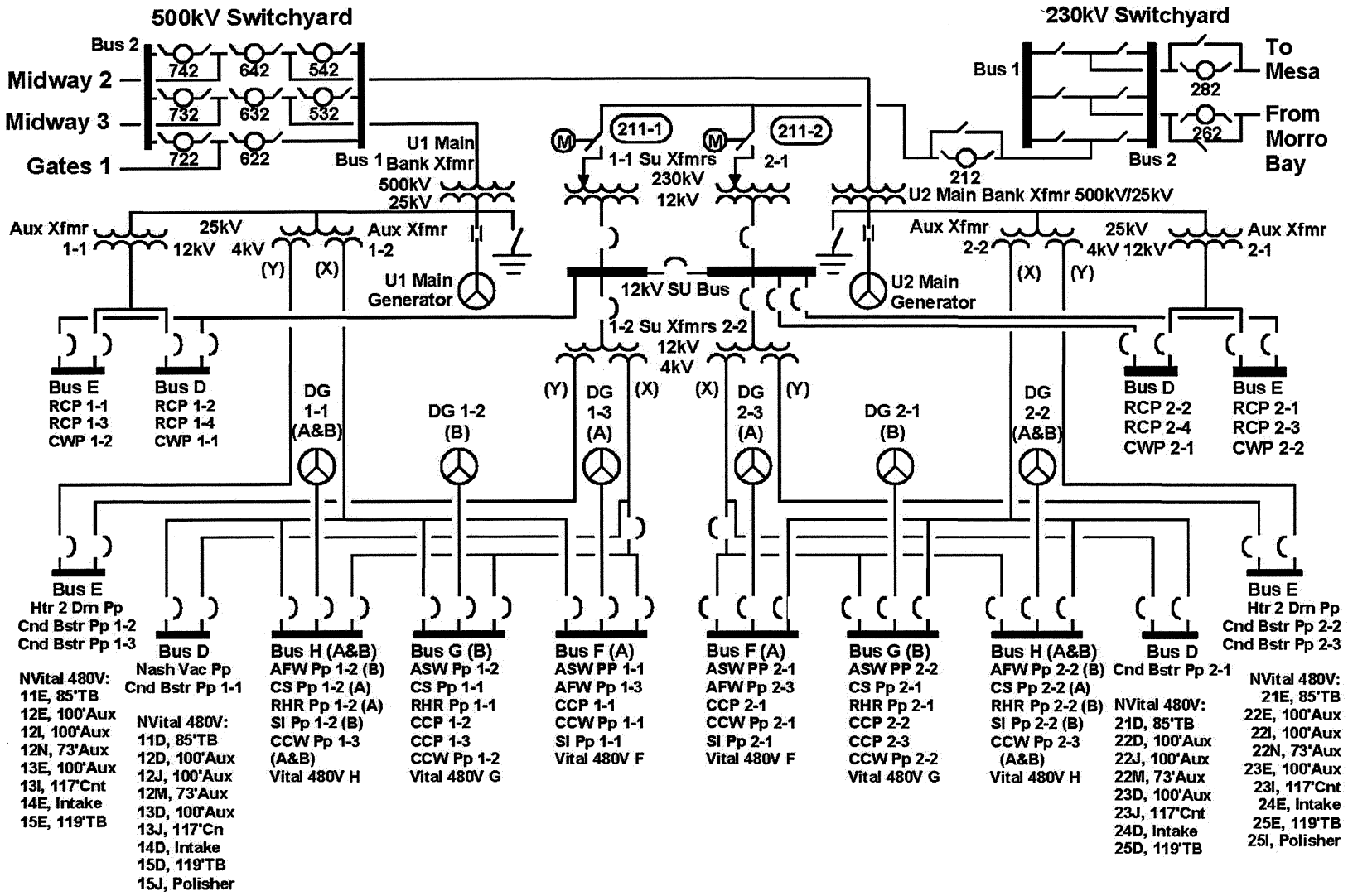
The DGs are the ac standby power supply when the preferred power supply is not available.

The Class 1E 4160 V distribution system provides power to ESF loads to safely shut down the unit. The 4160 V loads are divided into five groups; two of these groups are not vital to the ESFs and are connected to non-Class 1E 4160 V buses D and E. The three load groups important to safety are connected to 4160 V Class 1E buses F, G, and H. Each of these buses has three sources: two being the immediate and delayed preferred power supply, and the standby power supply from the DGs. The 4160 V system is a three-phase, three-wire, high-resistance-grounded neutral system that serves motors from 200 to 3000 hp, and transformers for the smaller loads at the lower voltages.

The 480 V loads are served from the 4160 V buses through 4160 V/480 V transformers closely coupled to either metal-enclosed low voltage switchgear or to motor control centers. The 480 V system is a three-phase, three-wire, ungrounded system that provides power to motors not greater than 350 hp, lighting and electric heating systems, battery chargers, and instrument and control systems.

The ESF loads and their onsite sources are grouped so the functions required during a major accident are provided regardless of any single failure in the electrical system. In

FIGURE 1- DCPP ELECTRICAL DISTRIBUTION ONE-LINE DIAGRAM



the event of a loss of satisfactory electrical power from the main generating unit, due to a unit trip, a safeguard signal, or a loss of voltage on the bus, the Class 1E 4160 V buses are automatically disconnected immediately from the main generator unit as a source. If power is available from the startup offsite power circuit, the Class 1E 4160 V buses are transferred to this source automatically after a short delay to allow for voltage decay on the motors that were running.

Each of the following initiates the starting of the DGs:

1) A Safety Injection actuation signal from either Train A or B of the ESF actuation system.
2) Undervoltage on the startup offsite power circuit to each of the Class 1E 4160 V buses starts its respective DG.
3) Sustained under-voltage or loss of voltage on any of the Class 1E 4160 V buses starts its respective DG.

Under accident and Loss of Offsite Power (LOOP) conditions, loads are sequentially connected to the bus by load sequencer timers. The sequencing logic controls the permissive and starting signals to motor breakers to prevent overloading of the DGs due to high motor starting currents. The load sequence time interval tolerances ensure 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.

3.2. DESCRIPTION OF DG DESIGN

Three dedicated 4160 V, three-phase, 60-Hz, 2600-kW, 0.8-PF continuous rating DGs are provided for each unit. The individual DG units are physically isolated from each other and from other equipment. Each DG supplies power to its associated Class 1E 4160 V bus. Any two of the three DGs and their buses are adequate to serve at least the minimum required ESF loads of a unit after a major accident.

Each DG unit consists of a self-contained diesel engine directly connected to an ac generator, and the separate accessories needed for proper operation, all mounted on a common structural steel skid-type base. Mechanical power is provided by an 18 cylinder, Vee configuration, four-cycle, 9-inch bore x 10-1/2 inch stroke, 12,024 cu in. displacement, 3630 hp at 900 rpm, turbocharged and aftercooled, heavy-duty, stationary-type diesel engine.

The DG skid has an integrally mounted radiator with a direct engine-driven fan for cooling the engine jacket water. The Jacket Water Cooling System is designed to control the operating temperature of the engine by removing combustion heat from the engine block. This system also provides cooling of the engine turbocharger and the engine lube oil system. The turbocharger aftercooler cools the air being injected into the engine, which allows a larger mass of air to be injected into the engine cylinders for combustion.

Ventilation of DG compartments is accomplished through the use of the same engine-driven fans that provide cooling air to the DG radiators. The ventilation air flow passes through the compartment, cooling the generator and absorbing surface heat losses from the diesel engine. In passing through the compartment, the temperature of the

ventilation air is raised when the DGs are operating. Increasing the DG output power, increases the heat transfer from the engine and the temperature of the air in the DG room.

The generator is rated at 3250 kVA, 0.8 PF, 4160 V, 60 Hz, three-phase, Y connected, ungrounded, 80°C temperature rise, Class B insulation, with a drip-proof enclosure. The transient reactance is 14.1 percent, and the subtransient reactance is 8.1 percent. The exciter is a static series, boost-type exciter controlled by a static solid-state voltage regulator.

The DGs have a net continuous electrical output rating of 2600 kW at 0.8 PF, and 2750 kW for 2000 hours per year. Short-term ratings of the DGs are 2860 kW for 2 hours per 24 hours, and 3056 kW for 30 minutes (reduced from 3250 kW based upon a reassessment performed by the DG manufacturer). During the starting sequence for the safeguard loads, these machines can also carry short-time overloads as discussed in Section 3.13.

The DGs were designed to Safety Guide 9 (March 1971), RP C.2, DG loading criteria. The standard ratings of the DGs are based upon inlet combustion air at the engine air intake filter less than or equal to 90°F and jacket water to the aftercoolers less than or equal to 160°F. If either or both of these parameters are exceeded, DG derating is required.

During transient conditions such as a design basis-loading scenario with nominal timer interval, the DGs maintain the electric power frequency within 5 percent, hold voltages to a minimum of 75 percent, and recover successfully by complying with Safety Guide 9 (March 1971) with the exception of RP C.4. Safety Guide 9 (March 1971), RP C.4, specifies that during the DG loading sequence, the voltage and frequency should be restored to within 10 percent and 2 percent of nominal, respectively, in less than 40 percent of each load sequence time interval. For auxiliary feedwater pump loading for DGs 1-1, 1-3, 2-2, and 2-3, the frequency is restored to within 2 percent of nominal in less than 60 percent of the load sequence time interval. Based on test data, DGs 1-1, 1-3, 2-2, and 2-3 have adequate margin to prevent overlapping of loads and meet the objectives of Safety Guide 9 (March 1971), RP C.4. This exception to Safety Guide 9 (March 1971), was approved by the NRC in License Amendment (LA) No. 211 to Facility Operating License No. DPR-80 and Amendment No. 213 to Facility Operating License No. DPR-82 for the DCPP, Unit Nos. 1 and 2, respectively, dated March 29, 2012 (Reference 5).

3.3. DESCRIPTION OF DG FUEL OIL DAY TANK

Each DG unit is equipped with a skid-mounted fuel oil day tank that has a capacity of 550 gallons, which provides about 2-1/2 hours of full load operation before fuel oil must be transferred from the underground storage tanks. In the unlikely event of malfunctions in both redundant fuel oil headers, such as a pump failure in one and piping blockage in the other, low level will be alarmed when sufficient fuel oil remains in the base mounted day tank for a nominal one-hour period of operation of the DG at full load. This nominal one-hour period is adequate for an operator (a) to correct a malfunction on one of the two redundant transfer headers, or (b) to line up manually the valves of the two headers into one path that will transfer fuel oil.

3.4. DESCRIPTION OF DG DAY TANK FUEL OIL REQUIREMENTS

The DCPP licensing basis requires that each DG day tank shall maintain a usable volume of fuel oil sufficient for a nominal one-hour of DG operation assuming the fuel oil consumption of the DG running at full load. Note that for purposes of fuel oil day tank capacity calculations, full load operation is a load that bounds the maximum post-accident loading. The minimum volume is obtained by considering: DG operation at full load for 60 minutes plus margin, the bounding fuel oil consumption rate, minimum acceptable fuel oil quality, potential DG degradation, unusable tank volume, and fuel oil density. The bounding fuel oil consumption rate for the DGs is 0.537 lb/kWh, increased by a factor of 1.08 to account for the reduced heating value of ultra-low sulfur fuel, and for changes in fuel grade and engine performance. The consumption rate was determined based upon test data of specific fuel oil consumption for each of the diesel generators during DCPP startup.

3.5. DG SURVEILLANCE TESTING COMPLIANCE WITH RG 1.108, R1 AND RG 1.9, R3

The purpose of this section is to explain the relationship in the DCPP licensing basis regarding the use of RG 1.9, Revision 3 (R3), July 1993 (Reference 6) and RG 1.108, R1, August 1977. DCPP is currently committed to RG 1.108, R1 for testing. As delineated in Section 3.5, DCPP is not committed to RG 1.9, R3.

In the Commission's Safety Evaluation Report Supplement No. 9 for DCPP, dated June 1980 (Reference 7), the Staff stated:

> *"Our review of the design, testing, surveillance, and maintenance provisions for the Diablo Canyon Units 1 and 2 onsite emergency diesels are described in Section 8.3.1 of the SER and Section 8.3 of SER Supplement 7. Our requirements include preoperational and periodic testing to assure the reliability of the installed diesel generators in accordance with the provisions of Regulatory Guide 1.108."*

The TS Bases for TS 3/4.8, "Electrical Power Systems," in NUREG-1151, "Technical Specifications for Diablo Canyon Nuclear Power Plant, Units 1 and 2," (Reference 8), stated:

> *"The Surveillance Requirements for demonstrating the OPERABILITY of the diesel generators are in accordance with the recommendations of Regulatory Guides 1.9 [SG 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."*

Summaries of DCPP license amendments associated with changes to the DG surveillance testing are as follows:

Per LAs 104 and 105 issued per letter dated June 26, 1995 (Reference 9), the requirement to perform a LOOP load sequence test within 5 minutes of completing the 24 hour load run was replaced by a hot restart with no required loading following a 2-hour loaded run. PG&E letter DCL-95-086 (Reference 10) stipulated that the proposed changes comply with the intent of RG 1.108, R1.

LAs 125 and 127 issued per letter dated June 5, 1998 (Reference 11), revised TS 3/4.8.1.1, "A.C. Sources - Operating." The change clarified that emergency DG testing is initiated from "standby" conditions rather than "ambient" conditions. The TS Bases 3/4.8.1 was revised to define standby temperatures as meaning that the diesel engine coolant and oil temperature is being maintained consistent with manufacturer recommendations of greater than or equal to 90°F but less than 175°F. The LAR (Reference 12) justification states that the proposed change is considered a clarification and is consistent with guidance contained in NUREG-1431, Revision 1 (Reference 13), and RG 1.9, R3. Both of these documents indicate that for the purpose of DG testing, the DGs are to be started from standby conditions. Although the LAR references RG 1.9, R3, the change is consistent in comparison to RG 1.108, R1, which states "the testing of the DG unit should simulate, where practicable, the parameters of operation (automatic start, load sequencing, load shedding, operation time, etc.) and environments (temperature, humidity, etc.) that would be expected if actual demand were to be placed on the system."

LAs No. 135 and 135 issued per letter dated May 28, 1999 (Reference 14) approved the conversion from the current Technical Specifications (CTS) to the Improved Standard Technical Specifications (ISTS). The LA was requested per PG&E Letter DCL-97-106, "Technical Specification Conversion License Amendment Request" (Reference 15), as supplemented by letters in 1998 dated January 9 (Reference 16), June 25 (Reference 17), August 5 (Reference 18), August 28 (Reference 19), September 25 (Reference 20), October 16 (Reference 21), October 23 (Reference 22), November 25 (Reference 23), December 4 (Reference 24), December 17 (Reference 25), and December 30 (Reference 26), and letters in 1999 dated February 24 (Reference 27), March 10 (Reference 28), April 28 (Reference 29), May 11 (Reference 30), May 19 (Reference 31), and May 27 (Reference 32).

The submittal was based upon NUREG-1431, "Standard Technical Specifications – Westinghouse Plants," Revision 1. The Technical Specification changes were of 5 types: 1) Administrative; 2) Less restrictive changes to CTS; 3) More restrictive changes to CTS; 4) Moving out of the CTS; and 5) Relocation. The acceptance of the changes was provided in the Safety Evaluation attached to LAs 135 and 135. Excluding administrative changes, three (3) changes were identified as recommended or consistent with RG 1.9, R3:

1. Revised the acceptable frequency for the load rejection test from 60 ± 3 Hz to less than or equal to 63 Hz and added the new requirement to maintain frequency between 58.8 to 61.2 Hz within 2.4 seconds following rejection of a load greater than or equal to the single largest post-accident load. The Amendments 135 and 135 Safety Evaluation lists this change as a more restrictive frequency recovery specification consistent with RG 1.9, "Selection and Diesel Generator Set Capacity for Standby Power Supplies," Rev. 3.

2. Replace the requirement in CTS SR 4.8.1.1.2.b.3, for the load rejection test, to maintain voltage within specified values by the less-restrictive requirement to maintain voltage between 3785 V to 4400 V within 2.4 seconds following rejection of a load greater than or equal to the single largest post-accident load.

The 2.4 second allowance for voltage and frequency is based on the recommendations of RG 1.9, "Selection and Diesel Generator Set Capacity for Standby Power Supplies," R3, for recovery from transients caused by the disconnection of the largest single load. The RG states that voltage and frequency should recover to within 10 percent and 2 percent of nominal, respectively, within 60 percent of the load sequence interval. The load sequence interval following addition of the largest load is 4 seconds. This change was considered to be less restrictive than the CTS.

3. Revise the DG loading requirements for the full load rejection test in CTS SR 4.8.1.1.2.b.4 to specify a kW load range instead of specifying only a single minimum acceptable kW load. The single kW load was replaced with a load range greater than or equal to 2370 kW and less than or equal to 2600 kW (90 percent to 100 percent of the DG continuous rating). Because the staff found the above load range to be consistent with the recommendations of RG 1.9, R3, Position 2.2.8, the proposed change was deemed acceptable (Reference 14).

During the review of the proposed TS changes, questions (RAIs 3.8.1-06 and 3.8.1-10) were raised regarding PG&E's commitment to RG 1.9, R3:

Per RAI 3.8.1-06:
"Since RG 1.9, Rev. 3 incorporates RG 1.108 and supersedes all previous RG 1.9 revisions, does the proposed ITS delete all references to RG 1.108 and to previous revisions to RG 1.9? Has the DCPP FSAR been updated to reflect Rev. 3?"

The PG&E Four Loop Owner's Group (FLOG) response was (Reference 25):

"Diablo Canyon is not committed to RG 1.9, Rev 3. The usage of this reference is based upon the STS, which uses both references RG 1.9, Rev 3 (STS LCO 3.8.1, Bases, Reference 3) and RG 1.108 (STS LCO 3.8.1, Bases, Reference 9). Although DCPP is not committed to RG 1.9, Rev 3, DOC 01-12-A is consistent with RG 1.9, Rev 3 for the referenced issue. It is also consistent with Diablo Canyon LA 127/125 dated June 5, 1998 and the CTS Bases."

NOTE: DOC 01-12-A is a reference change code in the TS markups. DOC 01-12-A referred to a proposed revision to an SR 4.8.1.1.2 footnote allowing an engine prelube period, which would be applicable to all DG SRs involving an engine start. This change was deemed administrative in nature and consistent with RG 1.9, "Selection of Diesel Generator Set Capacity for Standby Power Supplies," Rev. 3 and with NUREG-1431.

Also, per RAI 3.8.1-10: "DOC 01-27-LS9 references RG 1.108. However, other DOCs reference RG 1.9, Rev. 3 which incorporates RG 1.108. The DOCs cannot reference both documents. The DOCs must be changed to reference only RG 1.9, Rev. 3, or some prior revision to RG 1.9 and RG 1.108."

The PG&E FLOG response was (Reference 25):

"See response to Comment Number Q 3.8.1-06 (see above). DCPP is currently committed to RG 1.9, Rev 2 (December 1979) and RG 1.108 Rev 1 (August 1977). The Reference to RG 1.9, Rev 3 is in response to the specific issue addressed by NUREG-1431, Rev 1 Bases 3.8.1...."

Subsequent to the issuance of Amendments 135 and 135, PG&E requested a LA (LAR 11-03) that included an exception to RG 1.9, R0, also known as Safety Guide 9, "Selection of Diesel Generator Set Capacity for Standby Power Supplies," dated March 10, 1971 (Reference 2). As delineated in PG&E letter DCL-11-038 (Reference 33):

PG&E revised UFSAR Section 8.3.1.1.13.1 under 10 CFR 50.59 to identify the exceptions to RG 1.9, R0, based on RG 1.9, R2, that allows frequency recovery within 60 percent of the load block interval and allows "a greater percentage of the time interval may be used if it can be justified by analysis." These exceptions to RG 1.9, R0, based on RG 1.9, R2, should have received prior NRC approval and were incorrectly included through a change made to the UFSAR under 10 CFR 50.59.

As a result, the changes proposed in DCL-11-038 included:

1. Revise the SR Section for SR 3.8.1.9 to remove the sentence referencing RG 1.9, R2. RG 1.9, R2, is not part of the staff approved design or licensing basis for DCPP.

2. Revise the SR Section of the TS 3.8.1 Bases to replace the reference for the basis for the minimum and maximum frequency from RG 1.9, R2, to RG 1.9, R0, Position C.4 because DCPP has not committed to RG 1.9, R2, on the docket, and has not requested NRC approval to use the guidelines of RG 1.9, R2.

3. Update UFSAR Section 8.1.4.3 for RG 1.9, R0, to revise the text that states "DCPP is committed to Rev. 0 for DG steady state loading capability; Rev. 2 for DG frequency and voltage dip and recovery; and Rev. 3 for DG test scope and test interval frequency" to state "DCPP is committed to RG 1.9 Rev. 0 with the exception of RP C.4."

These proposed changes were approved by the Staff per LAs 211 and 213. The NRC staff evaluated the licensee's request to revise TS SRs 3.8.1.7, 3.8.1.12, 3.8.1.15, and 3.8.1.20 for the DG start time for DCPP. In summary, the staff concluded that the provisions of the SRs, as amended, will continue to ensure that proper transient and steady state voltage and frequency are attained consistent with the recommendations of RG 1.9, R3.

In regards to the requested exception to RG 1.9, R0, RP C.4, the staff concluded that permitting restoration of frequency to within 2 percent of nominal in less than 60 percent of the load sequence time interval is consistent with the guidance in RG 1.9, R2, dated December 1979, RG 1.9, R3 dated July 1993, and RG 1.9, Revision 4, dated March 2007.

In conclusion, the licensing basis for preoperational and periodic testing of the DCPP DGs is in accordance with the provisions of RG 1.108, R1. A comparison of DG testing requirements in RG 1.108, R1 to RG 1.9, R3 is provided in Attachment 6. The comparison demonstrates that the proposed DG surveillance requirements are consistent in comparison to RG 1.9, R3 and comply with or exceed RG 1.108, R1 requirements, excluding exceptions that are requested or were previously approved.

3.6. EXCEPTIONS TO REGULATORY GUIDE 1.108, R1 REQUESTED OR PREVIOUSLY APPROVED

3.6.1. Exception to Regulatory Guide 1.108, R1 Requested by this LAR

An exception to RG 1.108, R1, RP C.2.a.(3) is requested. Instead of operating the DG at a load equivalent to the 2-hour rating (2860 kW), the surveillance will load the DG to 2860 kW less instrument uncertainty, a test band, and any engine derating required due to ambient conditions at the time of the test (i.e., 2860 kW nominal).

RG 1.108, R1, RP C.2.a.(3) is to demonstrate full-load-carrying capability for an interval of not less than 24 hours, of which 22 hours should be at a load equivalent to the continuous rating of the DG and 2 hours at a load equivalent to the 2-hour rating of the DG.

The exception requested provides assurance that the 2-hour DG rating is not exceeded during testing, which would reduce equipment reliability. Performing the 2-hour test at the highest load permissible for a 2-hour period provides an adequate test of DG margin and endurance.

3.6.2. Exceptions to Regulatory Guide 1.108, R1 Previously Approved

The following exceptions to RG 1.108, R1 were previously approved:

1) An exception to RG 1.108, R1, RP C.2.a.(5) was previously approved. The DCPP SRs do not fully comply with this test, which is to demonstrate functional capability at full-load temperature conditions by rerunning the test phase outlined in RPs C.2.a.(1) and (2) immediately following C.2.a.(3). An exception to the DG hot restart testing guidelines of RG 1.108, R1, RP C.2.a.(5) based on use of a modified hot restart test was approved by the NRC in LA No. 105 to Facility Operating License No. DPR-80 and Amendment No. 104 to Facility Operating License No. DPR-82 for the DCPP, Unit Nos. 1 and 2, respectively, dated June 26, 1995.

2) Exceptions from RG 1.108, R1, RPs C.2.a.(9), C.2.d, C.2.e, and C.3 were previously approved based on compliance with NUMARC 93-01, R2 (Reference 34) as part of LAs No. 135 and 135 to Facility Operating Licenses No. DPR-80 and No. DPR-82 for the Diablo Canyon Power Plant, Unit Nos. 1 and 2, respectively, dated May 28, 1999. The LA was requested per PG&E Letter DCL-97-106, "Technical Specification Conversion License Amendment Request".

3) An exception from the testing frequency guidelines of RG 1.108, R1, RP C.2.a. was granted as part of the ISTS conversion (Amendments 135 and 135) to extend DG test frequency from 18 to 24 months. Surveillance requirements 3.8.1.9, 3.8.1.10, 3.8.1.11, 3.8.1.12, 3.8.1.14, 3.8.1.15, 3.8.1.16 and 3.8.1.17 are performed once every 24 months. RG 1.108, R1, RP C.2.a requires these tests to be performed at least once every 18 months.

3.7. DESCRIPTION OF TECHNICAL SPECIFICATION CHANGES

The descriptions of each TS change and the bases for the changes are provided below. As a supplement to these changes, Attachment 6 provides a comparison between RG 1.108, R1 and RG 1.9, R3. The purpose of the assessment is to ensure that the proposed changes comply with RG 1.108, R1 and are consistent in comparison to RG 1.9, R3, or an exception to RG 1.108, R1 has been requested.

The DG SR test load values proposed are nominal values, meaning that the SR load values are based upon standard DG ratings less instrument uncertainty, a test band, and any engine derating required due to ambient conditions at the time of the test. These elements will be addressed in the surveillance test procedures (STPs). The proposed test load values do not exceed the manufacturer's recommended ratings. Therefore, there is no impact on the current maintenance program intervals.

3.7.1. SR 3.8.1.3 Revision

SR 3.8.1.3 is in response to the RG 1.108, R1 RP C.2.c.(2) requirement to "demonstrate full-load-carrying capability (continuous rating) for an interval of not less than one hour. The test should also verify that the cooling system functions within design limits." The current SR 3.8.1.3 contains a test load band of greater than or equal to 2340 kW and less than or equal to 2600 kW for the DG one-hour full-load-carrying capability test. Per the Surveillance Frequency Control Program, this surveillance is performed every 31 days.

The current test load band of this surveillance does not satisfy RG 1.108, R1, RP C.2.c.(2). The current SR 3.8.1.3 test load band corresponds to 90 and 100 percent of the DG continuous rating, which is non-conservative. The load band was adopted as part of the conversion to the ISTS (Reference 31), which are based upon RG 1.9, R3. The current SR 3.8.1.3 also does not include verification that the DG cooling system functions within design limits, which is a RG 1.108, R1 requirement.

The results of the DG load study analysis (see Section 3.12 for more details) demonstrates that steady state loading of the DGs under worst-case conditions of output voltage, frequency and PF following a postulated DBA exceeds the DG continuous rating of 2600 kW. The maximum steady state accident load on any DG at 60.8 Hz and 4340 V is 2663 kW for the first 2 hours and then drops to a maximum of 2648 kW for the period between 2 and 3 hours. After 3 hours, the maximum steady state load on any DG drops to 2602 kW for the remainder of any transient (see Table 1 and Figures 2 and 3).

Based upon the results of the DG load study analysis, PG&E proposes a test load of 2860 kW (nominal) to demonstrate full-load-carrying capability. As indicated above, nominal means that the SR test values are based upon standard DG ratings less instrument uncertainty, a test band, and any engine derating required due to ambient conditions at the time of the test (see Section 3.8.1 for more details). The proposed test load criterion of 2860 kW (nominal) exceeds the post-accident load and the DG continuous rating of 2600 kW (see Figure 4). This test load value will provide adequate assurance of the machine's ability to carry 100 percent of worst-case DG loading during a postulated DBA, and satisfies RG 1.108, R1, RP C.2.c.(2).

Additionally, the proposed SR 3.8.1.3 contains verification that the DG cooling system functions within design limits. This requirement is proposed in order to fully comply with RG 1.108, R1, RP C.2.c.(2). The proposed TS Bases for SR 3.8.1.3 contain manufacturer recommendations to maintain the jacket water outlet temperature less than 185°F and the lube oil temperature less than 195°F.

As demonstrated above and in Attachment 6, the proposed SR changes comply with RG 1.108, R1, which is to demonstrate full-load-carrying capability, and are consistent in comparison to RG 1.9, R3.

3.7.2. SR 3.8.1.4 Revision

The DCPP licensing basis requires that each DG day tank shall maintain a usable volume of fuel oil sufficient for a nominal one-hour of DG operation assuming the fuel oil consumption of the DG running at full load. Note that for purposes of fuel oil day tank capacity calculations, full load operation is a load that bounds the maximum post-accident loading. The minimum volume is obtained by considering: DG operation at full load for 60 minutes plus margin, the bounding fuel oil consumption rate, minimum acceptable fuel oil quality, potential DG degradation, and fuel oil density.

The current SR 3.8.1.4 verifies that the diesel fuel oil stored in the day tank is equal to or greater than 250 gallons, which is non-conservative. Per the Surveillance Frequency Control Program, this surveillance is performed every 31 days. Analyses demonstrate that the DG day tank usable minimum volume of 258 gallons supports DG operation at 2750 kW plus margin for 60 minutes. SR 3.8.1.4 is revised to verify that each day tank contains a usable volume of greater than or equal to 258 gallon of fuel oil. This bounds the required volume determined by the updated design calculation.

SR 3.8.1.4 is not required by RG 1.108, R1 or RG 1.9, R3. This requirement was a Limiting Condition for Operation (LCO) that was converted to a SR as part of the conversion to the ISTS (Reference 31).

3.7.3. SR 3.8.1.9 Revision

SR 3.8.1.9 is in response to the RG 1.108, R1, RP C.2.a.(4) requirement to "demonstrate proper operation during DG load shedding, including a test of the loss of the largest single load ... and verify that the voltage requirements are met and that the overspeed limits are not exceeded." The current SR 3.8.1.9 contains a requirement to verify each DG rejects a load greater than or equal to its associated single largest post-accident load and to confirm that within 2.4 seconds following load rejection, the voltage is greater than or equal to 3785 V and less than or equal to 4400 V and the frequency is greater than or equal to 58.8 Hz and less than or equal to 61.2 Hz. Per the Surveillance Frequency Control Program, this surveillance is performed every 24 months.

The current voltage and frequency recovery time requirement does not conform to Safety Guide 9 (March 1971), RP C.4, which states voltage should be restored to within 10 percent of nominal and frequency should be restored to within 2 percent of nominal in less than 40 percent of each load sequence time interval. The current voltage and frequency recovery time requirement of the surveillance corresponds to 60 percent of each load time sequence interval. Each load time sequence interval is nominally 4 seconds. The current single largest load rejection voltage and frequency recovery time

requirements were adopted as part of the ISTS conversion approved by LAs 135 and 135.

The proposed SR 3.8.1.9 includes a revised requirement to confirm that within 1.6 seconds following load rejection, the voltage is greater than or equal to 3785 V and less than or equal to 4400 V and the frequency is greater than or equal to 58.8 Hz and less than or equal to 61.2 Hz, which conforms to Safety Guide 9 (March 1971), RP C.4. Since the surveillance demonstrates the transient response of DG voltage and frequency recovery, no change to current SR 3.8.1.9 voltage (greater than or equal to 3785 V and less than or equal to 4400V) or frequency (greater than or equal to 58.8 Hz and less than or equal to 61.2 Hz) bands is requested.

As demonstrated above and in Attachment 6, the proposed SR changes comply with Safety Guide 9 (March 1971), which for voltage and frequency recovery time is more conservative than RG 1.9, R3.

NOTE: The proposed change to SR 3.8.1.9 is not intended to cancel the approved exception to Safety Guide 9 (March 1971), RP C.4 for load sequencing of the Motor Driven Auxiliary Feedwater (MDAFW) Pumps approved per LAs 211/213.

3.7.4. SR 3.8.1.10 Revision

SR 3.8.1.10 is in response to the RG 1.108, R1, RP C.2.a.(4) requirement to "demonstrate proper operation during DG load shedding, including a ...complete loss of load." The current SR 3.8.1.10 contains a requirement to verify each DG does not trip and voltage is maintained less than or equal to 5075 V during and following a DG full-load rejection test load band of greater than or equal to 2340 kW and less than or equal to 2600 kW. Per the Surveillance Frequency Control Program, this surveillance is performed every 24 months.

The results of the DG load study analysis determined that the DG PF during maximum steady state loading of the DGs under worst case output voltage and frequency following a postulated DBA is approximately 0.84. Therefore, the current 0.87 value in SR 3.8.1.10 is non-conservative. The proposed SR contains a new note, which requires that if the DG full-load rejection test is performed with the DG synchronized with offsite power it shall be performed at a PF less than or equal to 0.84. The new note also states that if grid conditions do not permit, the PF limit is not required to be met and the PF shall be maintained as close to the limit as practicable. The new note ensures that the DG is tested under load conditions that are as close to design basis conditions as practicable. Recent surveillance test results have demonstrated that a PF of less than 0.84 can be achieved for all DGs. Additional guidance will be provided in the surveillance procedures as part of implementation of the LA to provide guidance to the operators on use of the new note added to SR 3.8.1.10.

The results of the DG load study analysis determined that maximum steady state loading of the DGs under worst-case output voltage and frequency following a postulated DBA is 2663 kW. In order to comply with RG 1.108, R1, RP C.2.a.(4), the test load must be higher than 2663 kW. The proposed SR 3.8.1.10 test loading value of 2860 kW (nominal) ensures that a test is performed that represents a complete loss of load without exceeding the 2-hour DG rating.

As a result of increasing the load rejection test load to 2860 kW (nominal), DCPP is revising the proposed voltage limit in SR 3.8.1.10 from 5075 V to 5096 V. The voltage limit of 5075 V was based upon a load rejection from 2600 kW with a PF of 0.8 (maximum continuous rating of the DG). The DCPP DGs were purchased as a package which included the diesel engine, the generator, and all generator regulating controls. The purchase specification required that the DG package must support a load rejection of 110 percent of rated load (2860 kW) at a PF of 0.8 without causing a DG trip or damage to equipment. Based upon this discussion, the 5096-V limit is considered a safe voltage and will not result in any adverse effect on the equipment or controls.

As demonstrated above and in Attachment 6, the proposed SR changes comply with RG 1.108, R1 and are consistent in comparison to RG 1.9, R3 for full-load rejection tests. The changes associated with PF are consistent with RG 1.9, R3. Note: RG 1.108, R1, RP C.2.a.(4) does not have a PF requirement.

3.7.5. SR 3.8.1.14 Revision

SR 3.8.1.14 is in response to the RG 1.108, R1, RP C.2.a.(3) requirement to "demonstrate full-load-carrying capability for an interval of not less than 24 hours, of which 22 hours should be at a load equivalent to the continuous rating of the DG and 2 hours at a load equivalent to the 2-hour rating of the DG. The test should also verify that the cooling system functions within design limits." The current SR 3.8.1.14 demonstrates full-load-carrying capability by testing greater than or equal to 2 hours at a test load band of greater than or equal to 2600 kW and less than or equal to 2860 kW. The remainder of the 24 hour test is at greater than or equal to 2340 kW and less than or equal to 2600 kW. The current SR 3.8.1.14 contains a requirement to operate at a PF of less than or equal to 0.87, which is within the range of 0.8 to 0.9 required by RG 1.9, R3. RG 1.108, R1, RP C.2.a.(3) does not have a PF requirement. Per the Surveillance Frequency Control Program, this surveillance is performed every 24 months.

The current test load bands of this surveillance, which are non-conservative, were developed as part of the conversion to the ISTS (Reference 31) but do not satisfy RG 1.108, R1, RP C.2.a.(3). The current test load band for the 2-hour portion of the surveillance corresponds to between 100 and 110 percent of the DG continuous rating. The test load band for the 22 hour portion of the surveillance corresponds to between 90 and 100 percent of the DG continuous rating.

For the proposed SR 3.8.1.14 revision, PG&E requests an exception to RG 1.108, R1, RP C.2.a.(3). Instead of operating the DG at a load equivalent to the 2-hour rating, the surveillance will load the DG to the 2-hour rating of 2860 kW (nominal), which means 2860 kW less instrument uncertainty, a test band, and any engine derating required due to ambient conditions at the time of the test (see Figure 4 for more details). The surveillance will demonstrate that the DGs have adequate margin at a test load greater than the maximum expected steady state accident load at the worst-case conditions of voltage and frequency.

PG&E also proposes a test load of 2750 kW (nominal) for the remaining 22 hour portion of the DG 24-hour full-load-carrying capability test. Per RG 1.108, R1, RP C.2.a.(3), the 22 hour test should be at a load equivalent to the continuous rating of the diesel generator. RG 1.9, R3, RP 2.2.9 requires testing for 22 hours at a load equal to 90 to 100 percent of its continuous rating. A load of 2750 kW less instrument uncertainty, a

test band, and less temperature derate (but not less than the accident profile) is greater than the continuous rating and greater than 90 percent of the maximum accident load (assuming the maximum accident load is the Safety Guide 9 (March 1971) equivalent of RG 1.9, R3 continuous rating).

The results of the DG load study analysis determined that the DG PF during maximum steady state loading of the DGs under worst case output voltage and frequency following a postulated DBA is approximately 0.84. Therefore, the current SR 3.8.1.14 value of 0.87 is non-conservative. The proposed SR 3.8.1.14 revises the value to 0.84 and adds a new note 2, which requires that if the DG 24-hour endurance test is performed with the DG synchronized with offsite power, testing shall be performed at a PF less than or equal to 0.84. Note 2 also states that if grid conditions do not permit, the PF limit is not required to be met and the PF shall be maintained as close to the limit as practicable. Note 2 ensures that the DG is tested under load conditions that are as close to design basis conditions as practicable. In recent surveillances, DCPP has been able to achieve a PF less than 0.84 for all DGs. This PF is representative of the worst-case DG loading during a postulated DBA.

Additionally, the proposed SR 3.8.1.14 contains verification that the DG cooling system functions within design limits and satisfies, in part, RG 1.108, R1, RP C.2.a.(3). The proposed TS Bases for SR 3.8.1.14 contain manufacturer recommendations to maintain the jacket water outlet temperature less than 185°F and the lube oil temperature less than 195°F.

As demonstrated above and in Attachment 6, the proposed 2 hour testing at a nominal value less than the 2-hour rating does not meet RG 1.108, R1. An exception to RG 1.108, R1, RP C.2.a.(3) is requested. The proposed 22 of 24 hour testing meets RG 1.108, R1, and is consistent in comparison to RG 1.9, R3, RP 2.2.9; which requires the 22-hour portion of the test to be at a load equal to 90 to 100 percent of its continuous rating. The addition to "verify DG cooling system functions within design limits" is a RG 1.108, R1 requirement. The changes associated with PF are consistent in comparison to RG 1.9, R3. RG 1.108, R1, RP C.2.a.(3) does not have a PF requirement.

3.7.6. SR 3.8.1.2, SR 3.8.1.7, SR 3.8.1.11, SR 3.8.1.12, SR 3.8.1.15, SR 3.8.1.19, and SR 3.8.1.20 Revisions

These DG TS surveillances are in response to the RG 1.108, R1, RP C.2.c.(1), C.2.a.(1), C.2.a.(2), C.2.a.(5) and C.2.b requirements to "verify that voltage and frequency are maintained within required limits." The current SRs contain non-conservative allowable steady state voltage and frequency bands of 3785 V to 4400 V and 58.8 Hz to 61.2 Hz, respectively. The proposed SRs contain more restrictive steady state voltage and frequency bands, developed as part of the DG load study analysis. The voltage band proposed is a change from greater than or equal to 3785 V and less than or equal to 4400 V ***to*** greater than or equal to 3980 V and less than or equal to 4340 V. This voltage band corresponds to ±4.3 percent of the nominal 4160 V voltage. The specified minimum steady state voltage of 3980 V is 95.7 percent of the nominal 4160 V output voltage and 240 V above the minimum utilization voltage specified in ANSI C84.1 (Reference 35). The minimum steady state voltage on the Class 1E 4160 V buses ensures adequate 4160 V, 480 V and 120 V levels. The specified maximum steady state output voltage of 4340 V is less than the maximum operating voltage for 4000 V motors specified in ANSI C84.1 (4400 V). The maximum steady state output

voltage 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 steady state frequency band proposed is a change from greater than or equal to 58.8 Hz and less than or equal to 61.2 Hz ***to*** greater than or equal to 59.2 Hz and less than or equal to 60.8 Hz. This frequency band corresponds to ±1.33 percent of the nominal 60 Hz frequency.

SR 3.8.1.2 (Start Test) and SR 3.8.1.7 (Fast-Start Test) are in response to RG 1.108, R1, RP C.2.c.(1) to "demonstrate proper startup and verify that the required voltage and frequency are automatically attained within acceptable limits and time. This test should also verify that the components of the DG unit required for automatic startup are operable."

SR 3.8.1.11 is in response to RG 1.108, R1, RP C.2.a.(1) to "demonstrate proper startup operation by simulating loss of all ac voltage and demonstrate that the diesel generator unit can start automatically and attain the required voltage and frequency within acceptable limits and time."

SR 3.8.1.12 is in response to RG 1.108, R1, RP C.2.a.(2), which states the DG should "demonstrate proper operation for design-accident-loading-sequence to design-load requirements and verify that voltage and frequency are maintained within required limits."

SR 3.8.1.15 is an exception to the DG hot restart testing guidelines of RG 1.108, R1, RP C.2.a.(5) based on use of a modified hot restart test. This exception was approved by the Staff in LA No. 105 to Facility Operating License No. DPR-80 and Amendment No. 104 to Facility Operating License No. DPR-82 for the DCPP, Unit Nos. 1 and 2, respectively, dated June 26, 1995.

SR 3.8.1.19 is a combined Safety Injection Actuation Signal (SIAS) and LOOP test not required by RG 1.108, R1. This test was added during the conversion to the ISTS (Reference 31), and is consistent with the RG 1.9, R3, RP 2.2.6 requirements.

SR 3.8.1.20 is in response to RG 1.108, R1, RP C.2.b, which requires conducting a test "in which redundant units are started simultaneously to help identify certain common failure modes undetected in single diesel generator unit tests."

Voltage and frequency instrument uncertainties during testing are addressed in the surveillance procedures.

As demonstrated in Attachment 6, the proposed SRs are consistent in comparison to RG 1.9, R3 requirements.

3.7.7. SR 3.8.1.15 Revision

SR 3.8.1.15 is in response to the RG 1.108, R1, RP C.2.a.(5) requirement to "demonstrate functional capability at full-load temperature conditions by rerunning the test phase outlined in RPs C.2.a.(1) and (2) ... immediately following (3)." The current SR 3.8.1.15 contains Note 1, which requires the surveillance to be performed after the DG has operated in a test load band of greater than or equal to 2340 kW and less than

or equal to 2600 kW for greater than or equal to 2 hours. This surveillance satisfies RG 1.108, R1, RP C.2.a.(5) in part, which states the DG must demonstrate functional hot restart capability at full-load temperature conditions. The prerequisite test load band corresponds to between 90 and 100 percent of the DG continuous rating. The test load band will ensure the hot restart functional capability test will be performed at temperature conditions corresponding to DG loading that exceeds the maximum steady state accident loading at worst case conditions of frequency and voltage. An exception to allow the hot restart surveillance to be performed without load sequencing, following a 2 hour loaded DG run was previously approved by the Staff in LA No. 105 to Facility Operating License No. DPR-80 and Amendment No. 104 to Facility Operating License No. DPR-82 for the DCPP, Unit Nos. 1 and 2, respectively, dated June 26, 1995. Per the Surveillance Frequency Control Program, this surveillance is performed every 24 months.

The proposed SR 3.8.1.15 modifies Note 1 to require the surveillance to be performed within 5 minutes of shutting down after the DG has previously operated at a test load of 2750 kW (nominal) for greater than or equal to 2 hours. This test loading value will ensure the hot restart functional capability test is performed at temperature conditions corresponding to DG loading that exceeds the maximum steady state accident loading at worst case conditions of frequency and voltage.

The proposed SR revision demonstrates the functional capability at full-load temperature as required by RG 1.108, R1, RP C.2.a.(5) without sequencing of the LOOP loads. Therefore, the proposed test complies with RG 1.108, R1, as modified by the approved exception and is consistent in comparison to RG 1.9, R3.

3.8. DIESEL GENERATOR DERATING

Per instructions from the DG manufacturer, engine derating may be required due to temperature effects. Two factors affect the DCPP DGs under conditions of high ambient air temperatures. These factors are:

a) Temperature at engine combustion air intake filter greater than 90°F; and

b) Water temperature to air intercooler inlet greater than 160°F.

The maximum air intake temperature for the DGs is determined based upon the highest hourly temperatures recorded at the Diablo Canyon site as documented in UFSAR Section 2.3.2.2.2. From the meteorological tower to the DG air intake filter, the intake air absorbs heat due to localized temperature effects and DG room air mixing. The jacket water temperature is governed by the DG load and heat removal capability of the radiator. The jacket water temperature increases as ambient temperatures increase.

Based upon these temperature effects, the DG derating affects the following:

3.8.1. DG capability to accommodate accident loads

The capability of the DGs to accommodate accident loads is based upon the Safety Guide 9 (March 1971), RP C.2 limit as adjusted for derating factors. The derate values presented in this LAR represent the maximum UFSAR site ambient temperatures plus allowances for uncertainties in temperature measurements between the meteorological

tower and the combustion air and radiator intake locations and margin. DG derating to accommodate maximum UFSAR site ambient temperatures, plus measurement uncertainties and the maximum temperature differential between ambient and the combustion air and radiator intake locations, will be maintained by PG&E. In no case, will the DG derating result in a Safety Guide 9 (March 1971), RP C.2 limit that is less than the worst case accident load. As an example, derating was evaluated for the expected worst case conditions where the inlet combustion air at the engine air intake filter is 120°F and water temperature to air intercooler inlet is 175°F. For this derating scenario, the Safety Guide 9 (March 1971) limit would be reduced to 2684 kW, which is 21 kW above the maximum accident load.

3.8.2. SR 3.8.1 surveillance requirement test loads

Typically, the STPs will be performed at ambient temperatures that do not necessitate DG derating in order to perform the surveillance. Per UFSAR Section 2.3.2.2.2, the average annual temperature at the plant site is approximately 55°F. Therefore, the STPs will be typically performed at temperatures that will not require derating the DGs. The SR test loads will account for only instrument uncertainty and a test band. If there are elevated temperatures during the testing, either the test will be postponed or the test band will be adjusted to account for the DG engine derated capability but greater than the maximum accident load.

As an example, Figure 4 delineates the relationship between the proposed SR 3.8.1.14 24-hour test values, STP test values adjusted for instrument uncertainty and the bounding accident loads, which are defined as follows:

a) Proposed SR Test Values – the standard DG ratings applicable to the SR. Does not include instrument uncertainty or derating for temperature effects.
b) STP test limit –the proposed SR Test Values minus instrument uncertainty and the STP test band. May include engine derating if ambient temperatures are elevated at the time of the test but bounds the maximum accident load.
c) STP test band – a 10 kW band for the performance of the STP based upon instrument readability.
d) Limiting accident load profile – the DG load profile for the worst case steady state accident loads for all of the DGs for the first 24 hours of the accident.

3.9. IMPACT OF LAR ON MARGIN

The requested changes to the License and the impact on margin can be summarized as follows:

3.9.1. Compliance with Regulatory Guide 1.108, R1

RG 1.108, R1 is the licensing basis for testing of the DCPP DGs. As is demonstrated in Section 3.5 and Attachment 6, the proposed SRs are in compliance with RG 1.108, R1 except where exceptions to RG 1.108, R1 are requested or were previously approved. Therefore, the changes that comply with RG 1.108, R1 do not reduce margin.

3.9.2. Compliance with Safety Guide 9 (March 1971)

Safety Guide 9 (March 1971) is the licensing basis for design of the DCPP DGs. This is important because the maximum accident load exceeds the DG continuous rating, which is permitted by Safety Guide 9 (March 1971) but not by RG 1.9, R3. Applying Safety Guide 9 (March 1971) will resolve a non-conservative SR. In addition, this LAR proposes to change the time requirement for voltage and frequency recovery following rejection of the largest single load from 2.4 seconds (RG 1.9, R3) to 1.6 seconds (Safety Guide 9, March 1971). These changes are not considered a reduction in safety margin because the changes comply with Safety Guide 9 (March 1971). Therefore, the changes that comply with Safety Guide 9 (March 1971) do not reduce margin.

3.9.3. Technical Specification Surveillance Requirements Revisions

3.9.3.1. Address non-conservative TS SR values to align the DG load test criteria with the maximum accident load.

The proposed changes to address the non-conservative TS SR values are addressed utilizing RG 1.108, R1 and Safety Guide 9 (March 1971) as the licensing bases. These changes do not significantly reduce the safety margin because the proposed DG load test criteria align with RG 1.108, R1 and Safety Guide 9 (March 1971) excluding the following exception:

RG 1.108, R1, RP C.2.a.(3) where 2-hours of 24-hour surveillance testing will be performed at the 2-hour rating less instrument uncertainty, a test band, and any engine derating required due to ambient conditions at the time of the test. This exception does not significantly reduce the safety margin established in RG 1.108, R1. Accounting for these variables provides assurance that the 2-hour DG rating is not exceeded during testing, which would reduce equipment reliability. Performing the 2-hour test at the highest load permissible for a 2-hour period provides an adequate test of DG endurance.

3.9.3.2. Address non-conservative TS SR value for DG day tank volume

The SR 3.8.1.4 minimum diesel fuel oil day tank volume is increased from 250 gallons to 258 gallons usable volume to resolve a non-conservative TS SR, which is based on a nominal one hour fuel requirement. The proposed change does not reduce the safety margin because the change is in compliance with the UFSAR 9.5.4.3.7 requirement for a nominal one hour period of operation of the engine at full load after the base-mounted day tank low level has alarmed.

3.9.3.3. Address non-conservative TS SR value for PF

The SR 3.8.1.10 and 3.8.1.14 requirement to maintain PF of less than or equal to 0.87 during and following testing is proposed to be changed to address non-conservative TS SRs. The proposed change is to add a note to each SR to maintain PF to less than or equal to 0.84 if performed with DG synchronized with offsite power. However, if grid conditions do not permit, the PF limit is not required to be met.

The results of the DG load study analysis determined that the DG PF during maximum steady state loading of the DGs under worst case output voltage and frequency following a postulated DBA is approximately 0.84. Revising the PF for these SRs does not reduce

the safety margin because RG 1.108, R1, RPs C.2.a.(4) and C.2.a.(3) do not specify a PF requirement for these tests. The change is consistent with RG 1.9, R3, RPs 2.2.8 and 2.2.9, which require maintaining PF between 0.8 and 0.9 during these tests.

3.9.3.4. Address the impact of the combustion air inlet temperature and jacket water temperature on the vendor-specified DG rating

An expected worst case derating of the vendor-specified DG rating has been incorporated into the DG load study analysis. As indicated previously, in no case will the DG derating result in a Safety Guide 9 (March 1971), RP C.2 limit that is less than the worst case accident load. Derating the DGs is not a reduction in margin because the expected worst case derated DG ratings comply with Safety Guide 9 (March 1971). That is, the predicted loads do not exceed the smaller of the derated 2000-hour rating, or 90 percent of the derated 30-minute rating of the DG set (derated Safety Guide 9, March 1971 limit). The margin between the limiting accident load (2663 kW) and the expected derated Safety Guide 9 (March 1971) limit (2684 kW) is 21 kW.

3.9.3.5. Address non-conservative allowable steady state DG frequency and voltage bands

The current TSs 3.8.1.2, 3.8.1.7, 3.8.1.11, 3.8.1.12, 3.8.1.15, 3.8.1.19 and 3.8.1.20 permit DG steady state frequency and voltage ranges of 60 Hz ± 1.2 Hz and 4160 V + 240 V, - 375 V, respectively. The proposed frequency and voltage bands are reduced to 60 Hz ± 0.8 Hz and 4160 V ± 180 V, respectively. The proposed DG steady state frequency and voltage ranges support the DG load analysis, which demonstrates that the derated Safety Guide 9 (March 1971) limit is greater than the maximum accident load profile. Therefore, there is no reduction in safety margin.

3.10. TS BASES 3.8.1 REVISION

The TS Bases proposed changes are provided in Attachment 3 for information only.

The "Background" Section of the TS 3.8.1 Bases is revised to clarify the standard DG ratings as follows: 2600 kW at PF 0.8 for continuous operation, 2750 kW for 2000 hours of operation in a 1 year period, 2860 kW for 2 hours of operation per a 24-hour period, and a 30 minute rating of 3056 kW.

The SR Section of the TS 3.8.1 Bases is revised to clarify the specified minimum and maximum steady state voltages and frequencies for Surveillances that test the DGs are 3980 V and 4340 V and 59.2 Hz and 60.8 Hz, respectively. These steady state values are equal to 4160 V ± 4.33 percent and 60 Hz ± 1.33 percent. The results of the DG load study analysis demonstrates that steady state loading of the DGs under worst-case output voltage and frequency following a postulated DBA is less than the Safety Guide 9 (March 1971), RP C.2 limit on predicted loading, including derating the DGs due to temperature effects.

The SR Section of the TS 3.8.1 Bases is revised to remove a reference to RG 1.9, R3 and to clarify that the current TS SRs for demonstrating the operability of the DGs are in accordance with the recommendations of RG 1.108, R1 and NUREG-1431, Revision 1 for the types of surveillance tests and surveillance frequencies.

The SR Section of the TS 3.8.1 Bases is revised to clarify the specified minimum and maximum steady state voltage of the DG as 3980 V and 4340 V. The specified minimum steady state voltage of 3980 V is 95.7 percent of the nominal 4160 V output voltage and 240 V above the minimum utilization voltage specified in ANSI C84.1. The minimum steady state voltage on the Class 1E 4160 V buses ensures adequate 4160 V, 480 V and 120 V levels. The specified maximum steady state output voltage of 4340 V is less than the maximum operating voltage for 4000 V motors specified in ANSI C84.1 (4400 V). The maximum steady state output voltage 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 SR Section of the TS 3.8.1 Bases for SR 3.8.1.2 and SR 3.8.1.7 is revised to provide clarification that the surveillance satisfies RG 1.108, R1, RP C.2.c.(1) by demonstrating proper DG startup and verifying that the required voltage and frequency are automatically attained within acceptable limits and time. This test should also verify that the components of the diesel generator unit required for automatic startup are operable.

The SR Section of the TS 3.8.1 Bases for SR 3.8.1.3 is revised to provide clarification that the surveillance satisfies, in part, RG 1.108, R1, RP C.2.c.(2), by demonstrating that the DG is capable of carrying the expected maximum load following a design basis accident for an interval of not less than one hour and verifying that the cooling system functions within design limits. Also, clarification is provided for note 3 that it satisfies RG 1.108, R1, RP C.1.b.(1), and RG 1.108, R1, RP C.2.b, in part, by requiring the redundant DG units to be tested independently (nonconcurrently).

The SR Section of the TS 3.8.1 Bases for SR 3.8.1.4 is revised to provide clarification that each DG shall be equipped with a day tank whose capacity is sufficient to maintain at least 60 minutes of operation. The volume of fuel required is equal to the usable minimum volume of 258 gallons plus the un-usable volume (which is slightly different for each day tank) and the amount of fuel remaining in the Diesel Fuel Oil (DFO) Priming Tanks at the low level alarm setpoint. The bases are also updated to clarify that for purposes of fuel oil day tank capacity calculations, full load operation is assumed to support one hour of DG operation which is sufficient to supply the continuous steady state loading of the Class 1E 4160 V ESF buses under maximum voltage (4340 V) and frequency (60.8 Hz) conditions following a postulated DBA.

The SR Section of TS 3.8.1 Bases for SR 3.8.1.6 is revised to provide clarification that the surveillance satisfies RG 1.108, R1, RP C.2.a.(7) by demonstrating that the engine will perform properly if switching from one fuel oil supply system to another. This is part of the normal operating procedure to satisfy the 7 day storage requirement.

The SR Section of the TS 3.8.1 Bases for SR 3.8.1.9 is revised to remove reference to the maximum electrical load of the centrifugal charging pump (CCP). The CCP load is now given as the nameplate 600 hp rating converted to kW based upon maximum operational frequency and motor efficiency. For conservatism, a load reject equal to or greater than 600 kW is used to bound this demand under worst case conditions. Also, SR 3.8.1.9 is revised to provide clarification that the surveillance satisfies Safety Guide 9 (March 1971), RP C.4, in part, and RG 1.108, R1, RP C.2.a.(4), in part, by demonstrating proper operation during DG load rejection, including a test of the loss of the largest single load. SR 3.8.1.9 is revised to state that a 0.9 PF is representative of

the largest single load used in the performance of this surveillance. SR 3.8.1.9 is revised to change the voltage and frequency recovery time from 2.4 seconds to 1.6 seconds.

The SR Section of the TS 3.8.1 Bases for SR 3.8.1.10 is revised to provide clarification that the surveillance satisfies RG 1.108, R1, RP C.2.a.(4), in part, by demonstrating proper operation during DG complete load rejection, including a test of complete loss of load, and verifying that the DG does not trip and that voltage requirements are met. Also, the Bases are revised to discuss a new note that is added to update the PF as a result of the DG load study analysis and provide the basis for the allowance of not meeting the PF requirement if grid conditions do not permit.

The SR Section of the TS 3.8.1 Bases for SR 3.8.1.11 is revised to provide clarification that the surveillance satisfies RG 1.108, R1, RP C.2.a.(1) by demonstrating proper startup operation by simulating loss of all ac voltage and demonstrating that the diesel generator unit can start automatically and attain the required voltage and frequency within acceptable limits and time. Also, SR Section of the TS 3.8.1 Bases for SR 3.8.1.11 is revised to provide clarification that the maximum voltage and frequency requirements of 4340 V and 60.8 Hz, respectively, for the surveillance must be met in order to verify the DGs do not exceed the Safety Guide 9 (March 1971), RP C.2 limit on predicted loads following a postulated DBA. The specified minimum and maximum steady state voltages and frequencies for this Surveillance were updated.

The SR Section of the TS 3.8.1 Bases for SR 3.8.1.12 is revised to provide clarification that the surveillance satisfies RG 1.108, R1, RP C.2.a.(2) by demonstrating proper operation for design accident loading-sequence to design-load requirements and verifying that voltage and frequency are maintained within required limits. SR 3.8.1.12 is revised to specify the minimum and maximum steady state voltages and frequencies for this Surveillance. SR 3.8.1.12 is revised to provide clarification that the maximum loading conditions associated with the voltage (4340 V) and frequency (60.8 Hz) limits must be bounded by this Surveillance in order to verify the DGs do not exceed the Safety Guide 9 (March 1971), RP C.2 limit on predicted loads following a postulated DBA.

The SR Section of the TS 3.8.1 Bases for SR 3.8.1.14 is revised to provide clarification that the surveillance involves an exception to RG 1.108, R1, RP C.2.a.(3), which is to demonstrate full-load-carrying capability for an interval of not less than 24 hours, of which 22 hours should be at a load equivalent to the continuous rating of the DG and 2 hours at a load equivalent to the 2-hour rating of the DG. The exception proposed is to change the 2-hour test load criterion to 2860 kW (nominal), which is less than the 2-hour DG rating when instrument uncertainty, a test band, and any engine derating required due to ambient conditions at the time of the test are addressed. The 22-hour portion of the test complies with RG 1.108, R1, RP C.2.a.(3). Also, clarification is provided that the surveillance satisfies RG 1.108, R1, RP C.2.a.(3) by verifying that the DG cooling system functions within design limits during the DG 24-hour full-load-carrying capability test. A discussion regarding proposed note 2 is added that updates the PF as a result of the DG load study analysis and requires the PF to be maintained to as close to design limits as practicable if grid conditions do not permit.

The SR Section of the TS 3.8.1 Bases for SR 3.8.1.15 is revised to provide clarification that the surveillance satisfies RG 1.108, R1, RP C.2.a.(5) requirements to demonstrate functional capability at full-load temperature conditions. SR 3.8.1.15 is revised to provide

clarification that the surveillance involves a previously approved exception to RG 1.108, R1, RP C.2.a.(5), which is to demonstrate functional capability at full-load temperature conditions by rerunning the test phase outlined in RPs C.2.a.(1) and (2) immediately following C.2.a.(3). The proposed modification to the previously approved exception permits a modified hot restart test after the DG has operated greater than or equal to 2 hours loaded to 2750 kW (nominal). SR 3.8.1.15 is revised to specify the minimum and maximum steady state voltages and frequencies for this Surveillance. SR 3.8.1.15 is revised to provide clarification that the maximum loading conditions associated with the voltage (4340 V) and frequency (60.8 Hz) limits must be bounded by this Surveillance in order to verify the DGs do not exceed the Safety Guide 9 (March 1971), RP C.2 limit on predicted loads following a postulated DBA.

The SR Section of the TS 3.8.1 Bases for SR 3.8.1.17 is revised to provide clarification that the surveillance satisfies RG 1.108, R1, RP C.2.a.(8), by demonstrating that the design of the DGs include an emergency override of the test mode to permit response to bona fide signals.

The SR Section of the TS 3.8.1 Bases for SR 3.8.1.19 is revised to provide clarification that the surveillance was established based upon NUREG-1431, Volume 1, Revision 1 and RG 1.9, R3, which includes a combined SIAS and LOOP Test. DCPP is not committed to RG 1.9, R3. This test is not required by RG 1.108, R1. SR 3.8.1.19 is revised to specify the minimum and maximum steady state voltages and frequencies for this Surveillance. SR 3.8.1.19 is revised to provide clarification that the maximum voltage and frequency requirements for this Surveillance demonstrates that the design basis accident load carrying capability of the DG can be met in order to verify that the DG can provide the maximum continuous steady-state loading of the Class 1E 4160 V ESF buses under worst-case conditions of voltage (4340 V) and frequency (60.8 Hz) following a postulated DBA.

The SR Section of the TS 3.8.1 Bases for SR 3.8.1.20 is revised to provide clarification that the surveillance satisfies RG 1.108, R1, RP C.2.b, in part, by requiring the redundant DG units to be started simultaneously to help identify certain common failure modes undetected in single DG unit tests. SR 3.8.1.20 is revised to specify the minimum and maximum steady state voltages and frequencies for this Surveillance. SR 3.8.1.20 is revised to provide clarification that the maximum loading conditions associated with the voltage (4340 V) and frequency (60.8 Hz) limits must be bounded by this Surveillance in order to verify the DGs do not exceed the Safety Guide 9 (March 1971), RP C.2 limit on predicted loads following a postulated DBA.

The References Section of the TS 3.8.1 Bases is revised to clarify Reference 3 as Safety Guide 9, dated March 10, 1971. Also, Reference 15 is revised from "Regulatory Guide 1.9 Rev. 3, July 1993" to "NUREG-1431", Revision 1, 'Standard Technical Specifications Westinghouse Plants,' dated April 1995.

3.11. UFSAR CHANGES

The UFSAR proposed changes are provided in Attachment 4 for information only.

UFSAR Section 8.3.1.1.6.3.13 is updated to revise the DG ratings in accordance with correspondence from the vendor, and to add a discussion regarding DG derating. UFSAR Section 8.3.1.1.6.1.15 is revised to add a fourth regulatory approved exception

to Regulatory Guide 1.108, R1. UFSAR Section 8.3.1.1.6.4 and the References section are revised to remove references to RG 1.9, R3.

The notes for UFSAR Table 8.3-1 are revised to add the DBAs considered in the DG Load Study Analyses; and add the Class 1E 4160 V ESF bus loading cases for each of the postulated DBAs evaluated in the DG Load Study Analyses. UFSAR Chapter 8 Tables 8.3-3 and 8.3-5 are updated to remove the specific numerical DG loading values provided, identify the safety related loads that are supplied from each Class 1E 4160 V bus and correct the DG rating values. UFSAR Chapter 8 Tables 8.3-6 and 8.3-7 are deleted in lieu of referring to UFSAR Figures 8.3-6, 8.3-7 and 8.3-8. The limiting DG loading values and PFs for each DG and associated bus are provided in new UFSAR Table 8.3-12.

3.12. DESCRIPTION OF DG LOAD STUDY ANALYSIS

To address the NRC resident inspector observations related to the implementation of NRC Temporary Instruction 2515/176, PG&E initiated a DG load study analysis to evaluate Class 1E 4160 V ESF bus loading under various DBA scenarios.

The analysis addressed the following specific items contained in NRC Temporary Instruction 2515/176:

- Account for factors that can affect DG rating such as DG loading, engine coolant outlet temperature, and combustion air intake temperature (see Section 3.8).
- Account for increased electrical loading resulting from DG operation at the maximum voltage and frequency allowed by the TS by considering the operation of rotating equipment at higher frequency and voltage, motor efficiencies, cable losses, and pump run-out conditions (see below and Section 3.17).
- Provide a basis for the PF limit included in the applicable TS SRs to ensure the proper PF is obtained during the tests and can demonstrate that the DG can achieve design loading (see below).
- Confirm the worst-case peak DBA kW load profile during postulated DBAs considering a range of allowable values of steady state frequency and voltage to envelop isochronous mode operation (see below).

The following potential limiting DBAs were considered in the DG load study analysis:

- Event 1: Large Break Loss of Coolant Accident (LBLOCA)
- Event 2: Small Break Loss of Coolant Accident (SBLOCA)
- Event 3: Steam Generator Tube Rupture (SGTR)
- Event 4: Steamline Rupture Inside Containment at Power
- Event 5: Steamline Rupture Inside Containment at Hot Zero Power
- Event 6: Feedwater Line Break (FWLB)
- Event 7: Loss of Normal Feedwater (LONF)
- Event 8: Loss of Offsite Power (LOOP)
- Event 9: Station Blackout (SBO)

The following Class 1E 4160 V ESF bus loading cases were considered for each of the postulated DBAs evaluated in the DG load study analysis:

- Case 1: All DGs operating energizing Class 1E 4160 V ESF buses (F, G & H) and supplying all associated accident loads with single component failure considerations
- Case 2: The DG associated with Class 1E 4160 V ESF bus F failed resulting in Class 1E 4160 V ESF bus F being deenergized, with accident loads supplied by Class 1E 4160 V buses G and H and associated DGs
- Case 3: The DG associated with Class 1E 4160 V ESF bus G failed resulting in Class 1E 4160 V ESF bus G being deenergized, with accident loads supplied by Class 1E 4160 V buses F and H and associated DGs
- Case 4: The DG associated with Class 1E 4160 V ESF bus H failed resulting in Class 1E 4160 V ESF bus H being deenergized, with accident loads supplied by Class 1E 4160 V ESF buses F and G and associated DGs
- Case 5: Failure of Solid State Protection System (SSPS) Train A will result in the DG associated with Class 1E 4160 V Bus F to fail and to fail one train of safeguards equipment which will render certain pump/fan mechanical load demands to not load on a Class 1E 4160 V Bus.
- Case 6: Failure of SSPS Train B will result in the DG associated with Class 1E 4160 V Bus G to fail and to fail one train of safeguards equipment which will render certain pump/fan mechanical load demands to not load on a Class 1E 4160 V Bus.

The DG load study analysis determined the equipment load demands for specific 4160 V and 480 V static loads and rotating equipment (pumps, fans, etc.) that are powered by the Class 1E 4160 V ESF buses, which are energized by the DGs following the postulated DBAs. The sequence of loads is not physically changing that could alter thermo-hydraulic or accident analysis. Limiting single component failures, Class 1E 4160 V ESF bus failures and SSPS Train failures were considered in the analysis to determine the maximum steady state load demands on the Class 1E 4160 V ESF buses.

The DG load study analysis utilized the DCPP design basis documents (e.g., drawings and calculations), plant procedures and safety analyses of record to determine electrical demands that are automatically and manually loaded onto the Class 1E 4160 V ESF buses following the postulated DBAs.

The DG load analysis assumes DG operation at a simultaneous maximum frequency of 60.8 Hz and maximum voltage of 4340 V, which maximizes the calculated DG load. The total peak steady state load on the DG consists of three components: motor loads, constant impedance loads (i.e., heating and lighting), and equipment (i.e., cable and transformer) losses. The variations of the three components as a function of voltage are different: motors are constant power loads where power is independent of voltage within the normal range voltage variation; constant impedance loads vary as the square of the ratio of operating voltage to rated voltage; and cable and transformer losses increase when voltage is decreased. A sensitivity analysis was performed with the DG frequency at 60.8 Hz and indicated that the increase in constant impedance loads due to the increase in operating voltage outweighs the increase in cable and transformer losses when voltage is reduced. Therefore, the maximum continuous peak loads were determined at the maximum operating voltage of 4340 V. The analysis demonstrated

that the Safety Guide 9 (March 1971), RP C.2 limit for predicted loads, which includes derating the DGs due to temperature effects, bound the maximum DBA electrical load demands over time.

In addition to the conservatism added by considering simultaneous maximum frequency and voltage, the DG load analysis considers simultaneous operation of all intermittent loads. Simultaneous operation of all intermittent loads is not predicted, but is assumed in the DG load study analyses for added conservatism.

An analysis was performed to consider the effects of an under-frequency (UF) concurrent with an under-voltage (UV) situation on the DCPP motors during steady state conditions. Under this situation, the greatest effect on the DCPP motor loads (i.e., power: kW, kVAR) is the UF condition. The UF condition reduces the motor speed and kW loads, which in turn reduces the DG kW load. The UV condition increases the current (i.e., amperage) draw of the motor, but does not significantly affect the motor power load, as previously addressed. Therefore, the condition combining UF and UV is not limiting for the DG load study analysis.

The DG load study analysis evaluated the PF occurring when the DG is operating at worst-case loads at proposed maximum DG output voltage and frequency. The resultant PF values for the different DBA events at the worst case loads are summarized in Table 1 representing the DG load conditions that are as close to design basis conditions as practicable. The PF less than or equal to 0.84 is representative of the actual design basis inductive loading the DG would experience under DBA conditions.

In the DG load study analysis, motor PF is assumed constant versus frequency within the 60 Hz to 60.8 Hz range and voltage of 3980 V to 4340 V range.

Basis: When motor terminal voltage increases, the current in the shunt magnetizing reactance of the motor increases, thereby increasing the total input reactive power to the motor. This results in increased motor input kVA. In order to keep the real power (kW) input to the motor constant, the PF decreases.

In the same manner, when the motor terminal voltage decreases, the current through the shunt magnetizing reactance decreases, thereby decreasing the total reactive power to the motor. This results in decreased motor input kVA. In order to keep the real power (kW) input to the motor constant, the PF increases.

When frequency increases, motor inductive reactance increases, which in turn increases the motor equivalent impedance at the motor terminals. The increase in motor input impedance in turn results in a reduction in motor input current. The reduced current in turn results in a decrease in motor input kVA due to a reduction in motor reactive power losses. In order to maintain rated motor kW input and account for a reduction in motor reactive power input, the motor PF increases.

When frequency decreases, motor inductive reactance decreases. This results in an increase of motor equivalent impedance at the motor input terminals, which in turn results in an increase in motor input current. As a result of current increase, motor input kVA increases due to the increase in reactive power losses in the motor circuit. To maintain motor real input power (kW) at the rated value, in motor PF decreases.

Because of this performance behavior, induction motors can be classified as constant real power loads and can be modeled with a constant PF for the frequency and voltage range specified by the DG load study analysis.

The summarized Class 1E 4160 V ESF bus loading results from the DG load study analysis are as follows:

As shown in Table 1, a load reduction occurs at two hours for buses F and H. A load reduction also occurs at three hours for buses G and H. These load reductions are due to decreased demands on the motor driven auxiliary feed water pumps (MDAFWP) two hours after a DBA and containment spray pumps (CSP) three hours after a DBA.

TABLE 1 – DG LOADING SUMMARY

Unit	DG	Bus	Description	Loading < 2 Hours (kW)	Loading 2-3 Hours (kW)	Loading > 3 Hours (kW)	Power Factor
1	1-3	F	Event 1, Case 4; LBLOCA, Bus H is De-Energized	2654	2593	2593	84.6%
	1-2	G	Event 1, Case 4; LBLOCA, Bus H is De-Energized	2648	2648	2338	85.4%
	1-1	H	Event 1, Case 3; LBLOCA, Bus G is De-Energized	2614	2553	2229	86.6%
2	2-3	F	Event 1, Case 4; LBLOCA, Bus H is De-Energized	2663	2602	2602	84.6%
	2-1	G	Event 1, Case 4; LBLOCA, Bus H is De-Energized	2641	2641	2330	85.1%
	2-2	H	Event 1, Case 3; LBLOCA, Bus G is De-Energized	2592	2531	2207	86.6%

From zero to two hours after a DBA, the MDAFWP flow (and power demand) is assumed to be at the run out protection flow limit or at run out conditions (depending on the assumed single failure). This is a conservative assumption since the maximum MDAFW pump flow occurs when the pump is at runout flow. MDAFW pump runout flow occurs when there is flow to a faulted steam generator (SG) coincident with a failure of the runout protection. By procedure, plant operators will isolate the faulted S/G within 10 minutes, which terminates the runout flow. This run out flow is greater than or equal to the DBA required MDAFWP flow. The decreased MDAFWP demand at two hours and beyond was determined by calculating the flow required for a single MDAFWP to remove all decay and sensible heat via the steam generators and safety valves. The maximum decay heat removal was determined using a conservative initial nuclear steam supply

system power level and decay heat correlation. The maximum sensible heat removal was determined by combining the thermal capacities of the primary and secondary components and fluid volumes with a maximum cooldown rate. No credit was taken for residual heat removal (RHR) cooling.

From zero to three hours after a DBA (during which containment spray (CS) is initiated) the CSP flow (and power demand) is assumed to be at the maximum hydraulic flow condition (depending on the assumed single failure). During this time, the Refueling Water Storage Tank (RWST) inventory would be depleted and CSP flow secured before the three hour period has elapsed. The CSP demand at three hours and beyond is assumed to be zero. This assumption is based upon an analysis that demonstrates an intermediate size SBLOCA scenario would not generate a Containment High-High signal and resulting CS initiation. The break size required to generate a Containment High-High signal and subsequent CS actuation would deplete the RWST within the first three hours. Containment spray, if required during recirculation, is provided by the RHR pumps.

All other DG loads that cycle or start based upon process signals are assumed to have started at the beginning of the DBA and remain on throughout the transient.

The DG load study analysis credits the reduction in bus loading due to 480 V loads that are designed to automatically disconnect from their respective load centers upon a loss of auxiliary and offsite power. These loads are not automatically loaded onto their DG buses and are not considered in the DG load study analysis unless operators are prompted by procedure to perform a manual action to reconnect the loads. In these cases, the loads are assumed to be reconnected immediately, unless it can be justified that operators would not take or delay the action (based on post-accident conditions).

In some cases, where equipment can be powered by one of two Class 1E buses, administrative controls are credited to control which power supply the 480 V equipment is aligned to.

The spent fuel pool pump (SFPPs) motors have momentary push button controls with a seal in contact. The contactor will drop out during the temporary loss of bus voltage during transfer to the DG and will require operator action to restart the pump(s). SFPPs are not required to be started during the first three hours of a postulated accident since this load is not required for mitigation of postulated plant accidents. An analysis demonstrates that the spent fuel pool would not start to boil for at least 11 hours. As such, these loads are not considered part of the DG initial loading. As noted in UFSAR Table 8.3-1, Note (j), the SFPPs are manually controlled loads that can be added to the Class 1E buses once the DG loading demand has diminished.

The DG load study analysis demonstrates that following a postulated DBA, the DG maximum continuous steady state loading (2663 kW) under worst-case steady state output voltage and frequency does not exceed the Safety Guide 9 (March 1971), RP C.2 limit. The Safety Guide 9 (March 1971), RP C.2 limit (2684 kW) used in the analysis is based upon the expected worst case derating of the DGs due to high inlet air temperature at the engine air intake filter and high jacket water temperature to the air intercooler.

FIGURE 2 - UNIT 1 DG LOAD PROFILE VS. SG 9 LIMITS

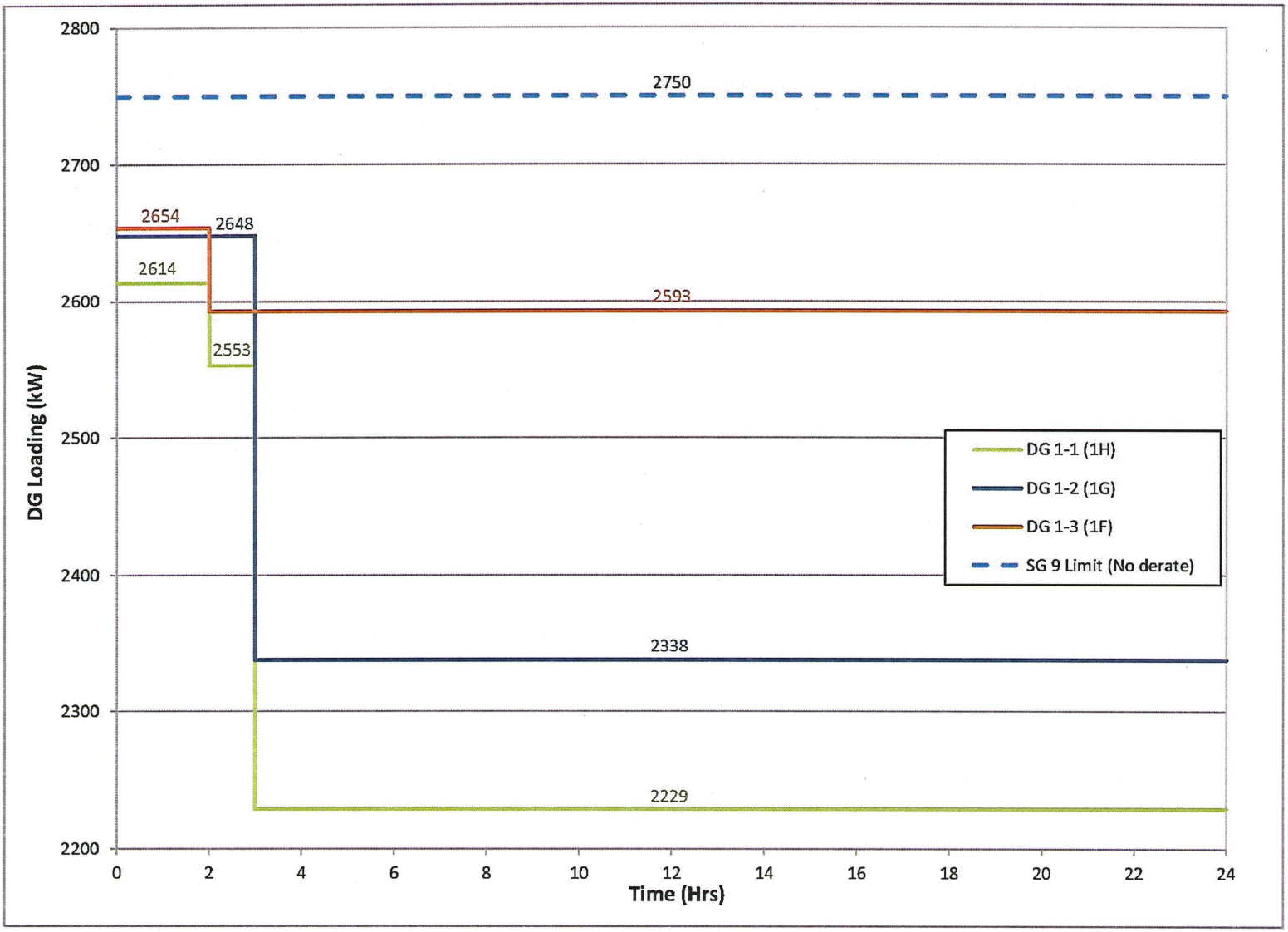


FIGURE 3 - UNIT 2 DG LOAD PROFILE VS. SG 9 LIMITS

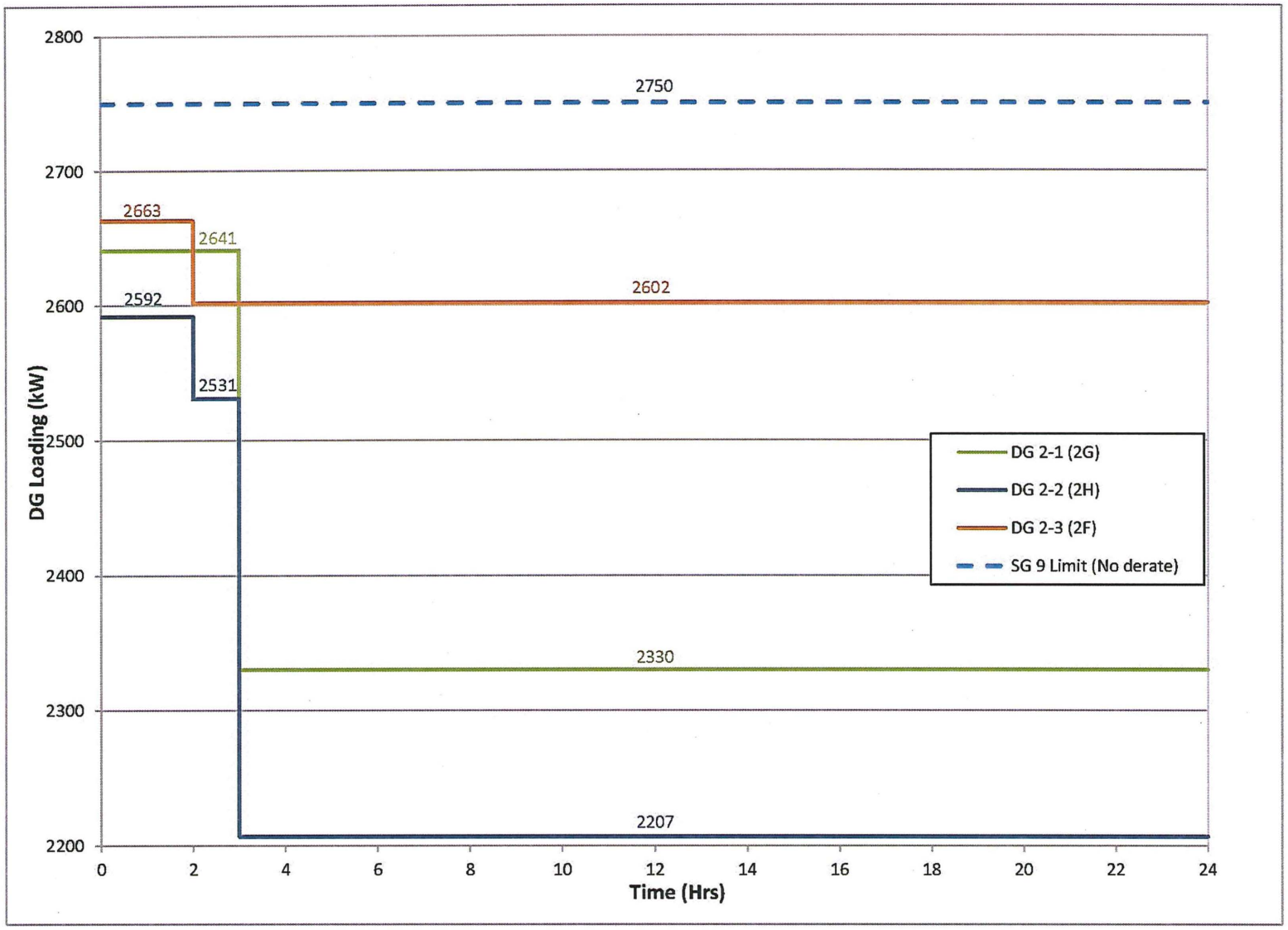
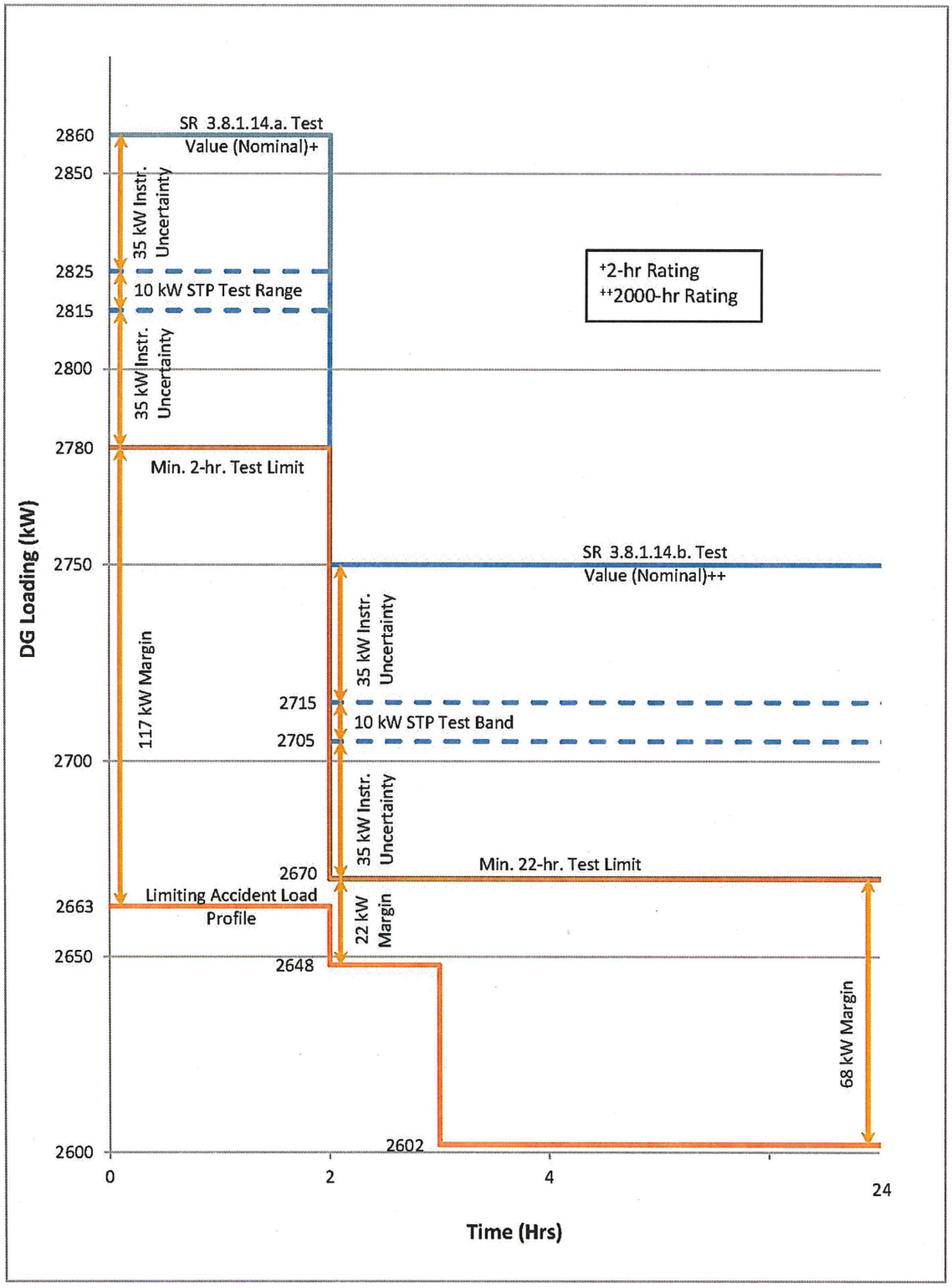


FIGURE 4 - LIMITING DG LOAD PROFILE VS. SURVEILLANCE TESTING VALUES



3.13. MOMENTARY PEAK LOADS

Transient Loading was evaluated and it was concluded that the highest peak momentary loads under worst-case output voltage and frequency do not exceed the capability of the DGs. All momentary loads that result in exceeding the Safety Guide 9 (March 1971), RP C.2 limit on predicted loads are attributable to motor locked rotor current and Motor Operated Valve stroking. The Safety Guide 9 (March 1971), RP C.2 limit based upon the expected worst case derating of the DGs for high inlet combustion air at the engine air intake filter and high jacket water temperature to the air intercooler is 2684 kW (see Section 3.8.1 for details). However, the momentary load's durations are shorter than a few seconds and do not exceed the expected worst case derated 30-minute rating of the DGs (2973 kW). Note, the steady state short term ratings are not considered a limit for momentary loads. The Unit 1 and Unit 2 DG steady state loading vs. time curves are presented in Section 3.12.

3.14. DIESEL GENERATOR GOVERNOR AND VOLTAGE REGULATOR PERFORMANCE

The past performance of the DG voltage and frequency control was reviewed from January 1, 2010 to December 31, 2012, to determine if the past test data would have satisfied the proposed LA Technical Specification requirements. The data used in the evaluation were taken from the monthly DG surveillance tests initiated by a simulated under-voltage signal causing the DG to start. This evaluation sample included 115 monthly surveillance tests. The performance of the DG frequency control documented in all of the evaluated surveillance tests would have satisfied the proposed LA frequency TS requirements. The voltage control documented in the past surveillance test data would have caused one test to not meet the proposed LA TS requirement. The one surveillance test that did not meet the proposed TS voltage requirement for steady state voltage of greater than or equal to 3980 V, was in compliance with the current TSs requirements.

3.15. HYDRAULIC IMPACT OF PROPOSED VOLTAGE AND FREQUENCY CHANGES

When considering the effects of DG voltage and frequency tolerances on pump performance, under-frequency and under-voltage conditions result in the most significant reduction in pump performance. The proposed changes to increase the minimum SR voltage from greater than or equal to 3785 V ***to*** greater than or equal to 3980 V and minimum frequency from greater than or equal to 58.8 Hz ***to*** greater than or equal to 59.2 Hz for SRs 3.8.1.2, 3.8.1.7, 3.8.1.11, 3.8.1.12, 3.8.1.15, 3.8.1.19, and 3.8.1.20, provide a basis for evaluating the performance of safety related pumps.

An analysis was performed to evaluate the Unit 1 and Unit 2 pumps required to mitigate design basis accidents. The analysis assessed the DGs operating at the proposed SR steady state under-voltage and under-frequency values.

The following pumps were evaluated:

- Safety Injection (SI) Pumps
- Centrifugal Charging Pumps (CCPs)

- Residual Heat Removal (RHR) Pumps
- Containment Spray (CS) Pumps
- Component Cooling Water (CCW) Pumps
- Auxiliary Saltwater (ASW) Pumps
- Motor-Driven Auxiliary Feedwater Pumps (MDAFWPs)

The methodology used the minimum safeguards pump curves, which are the basis for the pump flow rates credited in the accident analyses. The relationship between motor speed, voltage and frequency was used to create new curves which could be degraded based upon DG under-frequency conditions of 1.33 percent (59.2 Hz) and under-voltage conditions of 4.33 percent (3980 V) while still meeting the minimum safeguards curve requirements. The newly created curves were also adjusted to account for instrument uncertainties based upon the instrumentation used in performing the testing for the specific pump.

Data points from In-service Testing (IST) were compared to the minimum safeguards curves to show where the "as-found" pump performance falls in relation to the under-frequency/under-voltage pump curves with instrument uncertainty allowances. The as-found data was used to determine whether the safety-related pumps would continue to supply the minimum required flow rates required to support design basis accident conditions and to demonstrate if margin exists.

The results of the safety-related pump evaluations demonstrate that IST pump performance bounds the newly calculated minimum safeguards curves, with the exception of the containment spray pump flow curve, which ensures the pumps are acceptable for operation assuming worst case steady state DG under-frequency and under-voltage conditions.

The results of IST pump performance data indicate the CSP at flow rates of approximately 2500 gpm and above cannot meet the minimum safeguards curves adjusted to include DG under-frequency, DG under-voltage and instrument uncertainty. As a result, a new CSP flow delivery curve was developed based upon the adjusted minimum safeguards curve. A sensitivity study was performed for the double ended pump suction break with a reduction in CSP flow. The sensitivity study included an additional delay in starting the CSPs from 100 to 105 seconds with a reduction in spray flow of approximately 33 gpm at the design pressure of 47 psig. The result was that there was no increase in the calculated peak pressure, long-term 24 hour pressure or the long-term sump water temperature. Additionally, the CCW temperature was also only minimally effected showing a 0.1°F increase. Steamline break containment response analyses were performed to assess the impact of the reduced containment spray flow rate. The results demonstrate that all design criteria continue to be satisfied after consideration of the reduction in CSP flow. The negligible increase seen in CCW peak temperature from the peak pressure cases indicates that a CCW heat-up analysis is not needed.

3.16. IMPACT OF PROPOSED CHANGES ON MOTOR OPERATED VALVES

Motor Operated Valves (MOVs) were evaluated for operation at under-frequency and under-voltage conditions. DG frequency and voltage variations can impact stroke times for ac motors, which can affect MOV performance. Lower than nominal frequency and voltage result in a decrease in MOV motor speed, increasing valve stroke times. The torque developed by a motor is proportional to the square of the terminal voltage. Therefore, a reduction in terminal voltage reduces motor torque, which reduces the capability of the MOV to open and/or close.

Current MOV calculations are based upon a voltage of 3785 V or lower (85 percent voltage for the closing direction, and 80 percent opening direction, where there is no electrical calculation). Therefore, the increase of the DG minimum steady state voltage from 3785 V ***to*** 3980 V as proposed, will not affect the assumptions in the MOV calculations for degraded voltage.

MOVs were evaluated at either a worst case under-frequency of 58.8 Hz and under-voltage of 3785 V in order to bound scenarios where MOVs may be actuated during DG transient conditions or at a steady state under-frequency of 59.2 Hz and under-voltage of 3980 V in scenarios where MOVs may be actuated during steady state conditions. The analysis demonstrates that the MOVs will actuate within the timeframes required to support the assumptions in the accident analyses.

3.17. IMPACT OF PROPOSED CHANGES ON VALVE, FAN AND PUMP MOTORS

The proposed changes to reduce the SR voltage band to greater than or equal to 3980 V and less than or equal to 4340 V, and frequency band to greater than or equal to 59.2 Hz and less than or equal to 60.8 Hz for SRs 3.8.1.2, 3.8.1.7, 3.8.1.11, 3.8.1.12, 3.8.1.15, 3.8.1.19, and 3.8.1.20, results in a more limiting voltage and frequency operating bands for the DGs and associated motors powered by the DGs.

The DCPP DG-powered motors for pumps, fans, and MOVs are designed to the NEMA Standard MG-1 (References 36, 37 and 38). This standard specifies that ac induction motors, loaded in accordance with the criteria in the standard, will start and operate successfully under running conditions with a variation up to ±5 percent of rated frequency at rated voltage. Further the standard states that induction motors will successfully start and operate with a variation in voltage of 10 percent of nominal rated voltage, at rated frequency, at the motor terminals. Finally, the standard states that induction motors will start and operate with a combined variation of 10 percent (sum of absolute values) of the rated values, provided that the frequency variation does not exceed ±5 percent of rated frequency.

Motor starting time is a function of the accelerating torque. Reduced motor torque may stall a starting motor if the motor torque drops below the minimum required load torque. A change in DG operating frequency and voltage affects motor torque as follows:

- Motor torque is reduced when the voltage is reduced
- Motor torque is increased when the voltage is increased

- Motor torque is reduced when the frequency is increased
- Motor torque is increased when the frequency is reduced

Based on the above, it can be concluded that the worst-case scenario with respect to motor starting is simultaneous occurrence of reduced voltage and increased frequency.

Excluding the small voltage drop over cables from the DG to the 4000 V and 460 V DCPP motor terminals:

- The DG output voltage range of 3980 V – 4340 V (i.e., -0.5 percent, +8.5 percent of motor rated voltage [applicable to the DCPP 4160 V and 480 V motors]) is within the NEMA motor successful operating range.
- DG output frequency range of 59.2 Hz – 60.8 Hz (i.e., ±1.33 percent of motor rated frequency [applicable to the DCPP 4160 V and 480 V motors]) is within the NEMA motor successful operating range.

The containment fan cooler units (CFCUs), when run at high speed, have an inertia value which exceeds those of NEMA Standard MG-1. The CFCUs running at low speed do not exceed the NEMA Standard MG-1. A sensitivity analysis of motor starting was therefore performed to demonstrate that the DCPP CFCU motors would start and operate at the most limiting combination of voltage and frequency allowed by the proposed changes to TS 3.8.1. The sensitivity analysis evaluates the CFCUs at high speed since the inertia value is higher than at low speed.

Additionally, DCPP performed sensitivity analysis of the worst case motors to demonstrate that motors would start and operate at the most limiting combination of voltage and frequency allowed by the proposed changes to TS 3.8.1. These sensitivity analyses show that worst-case DCPP motors will start under the conditions proposed by TS 3.8.1.

As stated previously, the limiting condition for motor starting is the simultaneous occurrence of reduced voltage and increased frequency. For DCPP, simultaneous occurrence of reduced voltage and increased frequency is 1.83 percent, which is within the combined voltage and frequency variation allowed by NEMA Standard MG-1. Accordingly, the DCPP motors are expected to start and operate at the most limiting combination of voltage and frequency allowed by TS 3.8.1. Additionally, the proposed TS 3.8.1 voltage and frequency bands reduced the maximum allowable voltage variation below motor rated voltage from 5.4 percent to 0.5 percent and the maximum allowable frequency variation above the motor rated frequency from 2 percent to approximately 1.33 percent, which in turn results in an improvement in the worst-case combination of voltage and frequency for DCPP motors.

4. REGULATORY EVALUATION

4.1. APPLICABLE REGULATORY REQUIREMENTS

DCPP conforms to 10 CFR Part 50, Appendix A, General Design Criterion (GDC) 17, 1971, "Electric Power Systems," and GDC 18, 1971, "Inspection and Testing of Electric

Power Systems" for the onsite emergency power source. UFSAR Sections 3.1.8.3.1 and 3.1.8.3.2 discuss compliance with GDCs 17 and 18, respectively.

UFSAR Section 8.3.1.1.6.1.13 states that DCPP is committed to Safety Guide 9, March 1971.

The DG TS surveillance testing is performed in accordance with RG 1.108, R1, with exceptions that have been approved as part of previous amendments for DCPP Units 1 and 2 and with the approval of the requested exception to RG 1.108, R1, RP C.2.a.(3).

Paragraph 50.36(c)(2)(ii) of 10 CFR, "Technical Specifications," requires that "[a] TS limiting condition for operation [LCO] of a nuclear reactor must be established for each item meeting one or more of the [criteria set forth in 10 CFR 50.36(c)(2)(ii)(A)-(D)]." Paragraph 50.36(c)(3) of 10 CFR, "Technical Specifications," requires that TSs include SRs, which "are requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met."

Paragraph 50.65(a)(1) of 10 CFR, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," requires that power reactor licensees monitor the performance or condition of systems, structures, and components (SSCs) against licensee-established goals in a manner sufficient to provide reasonable assurance that such SSCs are capable of fulfilling their intended functions. Such goals are to be established commensurate with safety and, where practical, take into account industry-wide operating experience. When the performance or condition of an SSC does not meet established goals, appropriate corrective action must be taken.
Paragraph 50.65(a)(3) of 10 CFR, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," requires that "Performance and condition monitoring activities and associated goals and preventive maintenance activities shall be evaluated at least every refueling cycle provided the interval between evaluations does not exceed 24 months. The evaluations shall take into account, where practical, industry-wide operating-experience."

With the proposed revisions to the DCPP TS, TS Bases, and UFSAR , DCPP continues to meet the requirements of GDC 17 (1971), GDC 18 (1971), 10 CFR 50.36, and 10 CFR 50.65.

In conclusion, based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

4.2. PRECEDENT

The proposed changes to the TS result from the DG loading analysis, which demonstrate that steady state loading of the DGs under worst-case output voltage and frequency following a postulated DBA exceeds the DG continuous rating, but is less than the Safety Guide 9 (March 1971), RP C.2 limit on predicted loads. PG&E's submittal is

similar to LA No.109 to Renewed Facility Operating License No. DPR-18 issued to R.E. Ginna Nuclear Power Plant, LLC, on March 10, 2010, for the R.E. Ginna Nuclear Power Plant (Ginna)(Reference 39). The Ginna amendment allowed for surveillance testing at a DG loading greater than the continuous rating as needed to demonstrate the DG's ability to carry 100 percent of the expected maximum load following a DBA, as determined by DG steady state loading analysis.

PG&E's submittal is similar to LA No. 259 to Facility Operating License No. DPR-26 issued to Entergy Nuclear Operations, Inc., on April 22, 2009, for the Indian Point Nuclear Generating Unit No. 2 (Indian Point)(Reference 40). The Indian Point amendment resulted from NRC inspectors questioning the adequacy of the load ranges specified in SR 3.8.1.10 to demonstrate the capability of the DGs to operate at the peak loading conditions identified in the plant safety analyses for the limiting DBA and the licensee's acknowledgement of the need to submit a LAR to establish new load ranges that would envelop the peak accident loads. Indian Point also determined that a change to the PF test value would also be appropriate to ensure that the DG is tested under load conditions that are as close to design basis conditions as practicable. Additionally, the amendment allowed for the SR PF limit requirement to not be met if grid conditions do not permit.

PG&E's submittal is similar to LAs No. 129, 129 and 129 to Facility Operating Licenses No. NPF-41, NPF-51, and NPF-74 issued to Arizona Public Service Company, on October 4, 2000, for Palo Verde Nuclear Generating Station, Units 1, 2 and 3, respectively (Palo Verde)(Reference 41). The Palo Verde amendment resulted from a review of steady-state voltage and frequency requirements for safety-related equipment, which determined that the CTS limits for steady-state DG voltage and frequency were not conservative. The Palo Verde amendment reduced the steady state voltage and frequency bands but did not change the minimum voltage and frequency values required to be met after transients (i.e., fast starts and load reductions).

PG&E's submittal is similar to LA No. 191 to Facility Operating License No. DPR-43 issued to Innsbrook Technical Center, on May 1, 2007, for Kewaunee Power Station (Kewaunee)(Reference 42). The Kewaunee amendment permits performance of the DG rated load test at a reduced load consistent with the short-time rating for the DGs. The reduced loads approved by Amendment 191 are "nominal" loads, similar to the proposed load values in this LAR.

The current 3.8.1 SRs are based upon the LAs listed in Attachment 7. These LAs have been reviewed to ensure that this LAR does not impact any previously approved LAs and the changes in the proposed LAR do not have unintended effects on previously approved LARs. In addition, the LARs currently in review were evaluated and determined to not be impacted by this LAR. LAs currently being reviewed by the Staff are not impacted by this LAR.

4.3. NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

PG&E has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

1) Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

   Response: No.

   The proposed changes revise the acceptance criteria to be applied to existing TS surveillance tests of the facility DGs.

   The performing of a surveillance test is not an accident initiator and does not increase the probability of an accident occurring. The proposed new surveillance acceptance criteria will continue to assure that the DGs are capable of carrying the peak electrical loading assumed in the various existing safety analyses, which take credit for the operation of the DGs. The DG loads during the proposed surveillances are increased; however, they remain within vendor specifications.

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

2) Does the proposed change create the possibility of a new or different accident from any accident previously evaluated?

   Response: No.

   The proposed changes revise the acceptance criteria to be applied to existing TS surveillance tests of the facility DGs. The proposed changes do not involve installation of new equipment or modification of existing equipment, so no new equipment failure modes are introduced. The proposed revision to the DG surveillance test acceptance criteria is not a change to the way that the equipment or facility is operated and no new accident initiators are created.

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

3) Does the proposed change involve a significant reduction in a margin of safety?

   Response: No.

   The proposed changes revise the acceptance criteria to be applied to existing TS surveillance tests of the facility DGs. The conduct of performance tests on safety-related plant equipment is a means of assuring that the equipment is capable of maintaining the margin of safety established in the safety analyses for the facility. These changes do not significantly reduce the safety margin because the proposed SRs comply with RG 1.108, R1 and Safety Guide 9 (March 1971), or an exception

has been requested. The changes are consistent in comparison to RG 1.9, R3. The proposed DG test load values, which include the requested exception to RG 1.108, R1, are not a reduction in margin because the values are bounded by the DG manufacturer's ratings. With the proposed changes in the DG TS surveillance test acceptance criteria, the DG will continue to be tested in a manner that assures it will perform as assumed in the existing safety analyses.

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

Based on the above evaluation, PG&E concludes that the proposed changes do not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and accordingly, a finding of "no significant hazards consideration" is justified.

4.4. CONCLUSIONS

In conclusion, based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

4. ENVIRONMENTAL CONSIDERATION

PG&E has evaluated the proposed amendment and has determined that the proposed amendment does not involve (1) a significant hazards consideration, (2) a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, or (3) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c) (9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

5. REFERENCES

1. Regulatory Guide 1.108, Revision 1, "Periodic Testing of Diesel Generator Units Used as Onsite Electric Power Systems at Nuclear Power Plants," dated August 1977
2. Safety Guide 9, "Selection of Diesel Generator Set Capacity for Standby Power Supplies," dated March 10, 1971
3. NRC Temporary Instruction 2515/176, "Emergency Diesel Generator Technical Specification Surveillance Requirements Regarding Endurance and Margin Testing," dated May 16, 2008
4. NRC Letter, Summary of September 24, 2013, "Pre-Application Meeting with Pacific Gas and Electric Company to Discuss License Amendment Request Related to Diesel

Generator Technical Specifications (TAC NOS. MF2630 AND MF2631)," dated October 8, 2013

5. Amendment No. 211 to Facility Operating License No. DPR-80 and Amendment No. 213 to Facility Operating License No. DPR-82, "Diablo Canyon Power Plant, Unit Nos. 1 and 2 - Issuance of Amendments RE: Revision to Technical Specification 3.8.1, 'AC Sources – Operating,' to Incorporate TSTF-163, Revision 2 (TAC Nos. ME5939 and ME5940)," dated March 29, 2012

6. Regulatory Guide (RG) 1.9, Revision 3, "Selection, Design, Qualification, and Testing of Emergency Diesel Generator Units Used as Class 1E Onsite Electric Power Systems at Nuclear Plants," dated July 1993

7. Diablo Canyon Nuclear Power Station, Units 1 and 2, "Safety Evaluation Report Supplement No. 9," dated June 1980

8. NUREG-1151, "Technical Specifications for Diablo Canyon Nuclear Power Plant, Units 1 and 2," dated August 1985

9. Amendment No. 105 to Facility Operating License No. DPR-80 and Amendment No. 104 to Facility Operating License No. DPR-82, "Issuance of Amendments for Diablo Canyon Nuclear Power Plant, Unit No. 1 (TAC No. M91996) and Unit No. 2 (TAC No. M91997)," dated June 26, 1995

10. PG&E Letter DCL-95-086, "License Amendment Request 95-03, Revision of Technical Specification 3/4.8.1.1 - Diesel Generator Surveillance Requirements," dated April 19, 1995

11. Amendment No. 127 to Facility Operating License No. DPR-80 and Amendment No. 125 to Facility Operating License No. DPR-82 for the Diablo Canyon Nuclear Power Plant, Unit Nos. 1 and 2, respectively, "Issuance of Amendments for Diablo Canyon Nuclear Power Plant, Unit No. 1 (TAC No. M98128) and Unit No. 2 (TAC No. M98129)," dated June 5, 1998

12. PG&E Letter DCL-97-028, "License Amendment Request 97-02: Revision of Technical Specifications 3/4.8.1.1 and 3/4.3.2," dated February 27, 1997

13. NUREG-1431, Revision 1, "Standard Technical Specifications - Westinghouse Plants," dated April 1995

14. Amendment No. 135 to Facility Operating License Nos. DPR-80 and DPR-82, "Conversion to Improved Standard Technical Specifications for Diablo Canyon Power Plant, Units 1 and 2 - Amendment No. 135 to Facility Operating License Nos. DPR 80 and DPR-82 (TAC Nos. M98984 and M98985)," dated May 28, 1999

15. PG&E Letter DCL-97-106, "Technical Specification Conversion License Amendment Request," dated June 2, 1997

16. PG&E Letter DCL-98-003, "License Amendment Request 97-09 Errata," dated January 9, 1998

17. PG&E Letter DCL-98-087, "License Amendment Request 97-09, 'Technical Specification Conversion,' Response to Request for Additional Information for Section 3.6," dated June 25, 1998

18. PG&E Letter DCL-98-107, "License Amendment Request 97-09, 'Technical Specification Conversion,' Response to Request for Additional Information for Sections 3.1, 3.2, 3.5, 3.9, and 4.0," dated August 5, 1998

19. PG&E Letter DCL-98-116, "License Amendment Request 97-09, 'Technical Specification Conversion,' Response to Request for Additional Information for Sections 1.0, 2.0, and 3.0," dated August 28, 1998

20. PG&E Letter DCL-98-134, "License Amendment Request 97-09, 'Technical Specification Conversion,' Response to Request for Additional Information for Sections 3.4 and 5.0," dated September 25, 1998

21. PG&E Letter DCL-98-144, "License Amendment Request 97-09, 'Technical Specification Conversion,' Response to Request for Additional Information for Section 3.7," dated October 16, 1998

22. PG&E Letter DCL-98-154, "Follow-up Items Related to Proposed Conversion to the Improved Technical Specifications Sections 3.1, 3.2, 3.4, 3.5, and 5.0," dated October 23, 1998

23. PG&E Letter DCL-98-168, "Follow-up Items Related to Proposed Conversion to the Improved Technical Specifications Sections 1.0, 3.6, 3.9, and 5.0," dated November 25, 1998

24. PG&E Letter DCL-98-167, "License Amendment Request 97-09, 'Technical Specification Conversion,' Response to Request for Additional Information for Section 3.3," dated December 4, 1998

25. PG&E Letter DCL-98-180, "License Amendment Request 97-09, 'Technical Specification Conversion,' Response to Request for Additional Information for Section 3.8," dated December 17, 1998

26. PG&E Letter DCL-98-185, "Follow-up Items Related to Proposed Conversion to the Improved Technical Specifications Sections 1.0, 3.1, 3.2, 3.3, 3.4, 3.6, 3.9, and 5.0," dated December 30, 1998

27. PG&E Letter DCL-99-028, "Follow-up Items Related to Proposed Conversion to the Improved Technical Specifications Sections 1.0, 3.2, 3.3, 3.4, 3.6, 3.9, and 5.0," dated February 24, 1999

28. PG&E Letter DCL-99-034, "Follow-up Items Related to Proposed Conversion to the Improved Technical Specifications Sections 3.3, 3.4, 3.6, 3.8, and 3.9," dated March 10, 1999

29. PG&E Letter DCL-99-063, "Follow-up Items Related to Proposed Conversion to the Improved Technical Specifications Sections 3.1, 3.3, 3.4, 3.6, 3.7, 3.8, 3.9, and 5.0," dated April 28, 1999

30. PG&E Letter DCL-99-070, "Supplement 1 to License Amendment Request 97-09, 'Technical Specification Conversion' Application," dated May 11, 1999

31. PG&E Letter DCL-99-072, "Submittal and Certification of the Improved Technical Specifications and Bases," dated May 19, 1999

32. PG&E Letter DCL-99-078, "Revised Improved Technical Specification Pages," dated May 27, 1999

33. PG&E Letter DCL-11-038, "Revision to Technical Specification 3.8.1 'AC Sources - Operating' for Traveler TSTF-163, Revision 2, and Exception to Regulatory Guide 1.9, Revision 0," dated March 28, 2011

34. NUMARC 93-01, Revision 2, "Industry Guidelines for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," dated April 1996

35. ANSI C84.1-1977, "American National Standard for Electric Power Systems and Equipment - Voltage Ratings (60 Hz)"

36. NEMA Standard MG-1, "Motors and Generators," Publication Date 1964

37. NEMA Standard MG-1, "Motors and Generators," Publication Date 1974

38. NEMA Standard MG-1, "Motors and Generators," Publication Date 1978

39. Amendment No. 109 to Renewed Facility Operating License No. DPR-18 for the R.E. Ginna Nuclear Power Plant, "Amendment Regarding Changes Related To Limiting Conditions For Operation In Technical Specifications 3.3.2, 3.3.4, AND 3.8.1 (TAC NO. ME0291)", dated March 10, 2010 (Accession Number ML100261572)

40. Amendment No. 259 to Facility Operating License No. DPR-26 for the Indian Point Nuclear Generating Unit No. 2, "Indian Point Nuclear Generating Unit No.2 - Issuance of Amendment Re: Emergency Diesel Generator Surveillance Test (TAC NO. MD9214)", dated April 22, 2009 (Accession Number ML090840073)

41. Amendment Nos. 129, 129 and 129 to Facility Operating Licenses No. NPF-41, NPF-51, and NPF-74 for the Palo Verde Nuclear Generating Station, Units 1, 2, and 3, respectively, "Palo Verde Nuclear Generating Station, Units 1, 2, And 3 - Issuance of Amendments on Diesel Generator Steady-State Voltage and Frequency (TAC NOS. MA9214, MA9215, and MA9216)," dated October 4, 2000 (Accession Number ML003758500)

42. Amendment No. 191 to Facility Operating License No. DPR-43 for the Kewaunee Power Station, "Kewaunee Power Station - Issuance Of Amendment Regarding Emergency Diesel Generator Rated Load Testing (TAC NO. MA3995)," dated May 1, 2007 (Accession Number ML071200186)

Enclosure
Attachment 1
PG&E Letter DCL-14-018

Technical Specification Pages Markups

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.8.1.1	Verify correct breaker alignment and indicated power availability for each required offsite circuit.	In accordance with the Surveillance Frequency Control Program
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. ---------- Verify each DG starts from standby conditions and achieves steady state voltage ≥ ~~3785~~3980 V and ≤ ~~4400~~4340 V, and frequency ≥ ~~58.8~~59.2 Hz and ≤ ~~61.2~~60.8 Hz.	In accordance with the Surveillance Frequency Control Program
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 ~~≥ 2340 kW and ≤ 2600~~of 2860 kW (nominal) and DG cooling system functions within design limits.	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.4	Verify each day tank contains a usable volume of ≥ ~~250~~258 gal of fuel oil.	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.5	Check for and remove accumulated water from each day tank.	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.6	Verify the fuel oil transfer system operates to transfer fuel oil from storage tanks to the day tank.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
SR 3.8.1.7	----------NOTE---------- All DG starts may be preceded by an engine prelube period. ---------- Verify each DG starts from standby condition and achieves: a. In ≤ 10 seconds, voltage ≥ 3785 V and frequency ≥ 58.8 Hz; and b. Steady state voltage ≥ ~~3785~~3980 V and ≤ ~~4400~~4340 V, and frequency ≥ ~~58.8~~59.2 Hz and ≤ ~~61.2~~60.8 Hz.	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.8	----------NOTE---------- This Surveillance shall not normally be performed for automatic transfers in MODE 1 or 2. However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. ---------- Verify automatic and manual transfer of AC power sources from the normal offsite circuit to the alternate required offsite circuit and manual transfer from the alternate offsite circuit to the delayed access circuit.	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.9	----------NOTES---------- 1. This Surveillance shall not normally be performed in MODE 1 or 2. However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. 2. If performed with the DG synchronized with offsite power, it shall be performed at a power factor ≤ 0.9. ---------- 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 ≤ 63 Hz; b. Within ~~2.4~~1.6 seconds following load rejection, the voltage is ≥ 3785 V and ≤ 4400 V; and c. Within ~~2.4~~1.6 seconds following load rejection, the frequency is ≥ 58.8 Hz and ≤ 61.2 Hz.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.10	----------NOTE---------- If performed with DG synchronized with offsite power, testing shall be performed at a power factor ≤ 0.84. However, if grid conditions do not permit, the power factor limit is not required to be met. Under this condition, the power factor shall be maintained as close to the limit as practicable. ---------- Verify each DG ~~operating at a power factor ≤ 0.87~~ does not trip and voltage is maintained ≤ ~~5075~~5096 V during and following a load rejection of ~~≥ 2340 kW and ≤ 2600~~2860 kW (nominal).	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.11	----------NOTES---------- 1. All DG starts may be preceded by an engine prelube period. 2. This Surveillance shall not normally be performed in MODE 1, 2, 3, or 4. However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. ---------- Verify on an actual or simulated loss of offsite power signal: 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 in ≤10 seconds, 2. energizes auto-connected loads through auto-transfer sequencing timers, 3. maintains steady state voltage ≥ ~~3785~~3980 V and ≤ ~~4400~~4340 V, 4. maintains steady state frequency ≥ ~~58.8~~59.2 Hz and ≤ ~~61.2~~60.8 Hz; and 5. supplies permanently connected and auto-connected loads for ≥ 5 minutes.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.12	----------NOTES---------- 1. All DG starts may be preceded by an engine prelube period. 2. This Surveillance shall not normally be performed in MODE 1 or 2. However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. ---------- Verify on an actual or simulated Safety Injection signal each DG auto-starts from standby condition and: a. In ≤ 10 seconds after auto-start and during tests, achieves voltage ≥ 3785 V and frequency ≥ 58.8 Hz; b. Achieves steady state voltage ≥ ~~3785~~3980 V and ≤ ~~4400~~4340 V, and frequency ≥ ~~58.8~~59.2 Hz and ≤ ~~61.2~~60.8 Hz; c. Operates for ≥ 5 minutes; d. Permanently connected loads are energized from the alternate offsite power source; and e. Emergency loads are auto-connected through the ESF load sequencing timers to the alternate offsite power source.	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.13	Verify each DG's automatic trips are bypassed when the diesel engine trip cutout switch is in the cutout position and the DG is aligned for automatic operation except: a. Engine overspeed; b. Generator differential current; and c. Low lube oil pressure;	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.14	----------NOTES---------- 1. Momentary transients outside the load and power factor ranges do not invalidate this test. 2. If performed with DG synchronized with offsite power, testing shall be performed at a power factor ≤ 0.84. However, if grid conditions do not permit, the power factor limit is not required to be met. Under this condition, the power factor shall be maintained as close to the limit as practicable. ---------- Verify each DG ~~operating at a power factor ≤0.87~~ operates for ≥ 24 hours: a. For ≥ 2 hours loaded ~~≥ 2600 kW and ≤~~ at 2860 kW (nominal); and b. For the remaining hours of the test loaded ~~≥ 2340kW and ≤ 2600~~at 2750 kW (nominal); and c. Verify DG cooling system functions within design limits.	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.15	----------NOTES---------- 1. This Surveillance shall be performed within 5 minutes of shutting down the DG after the DG has operated ≥ 2 hours loaded ~~≥ 2340 kW and ≤ 2600~~at 2750 kW (nominal). Momentary transients outside of load range do not invalidate this test. 2. All DG starts may be preceded by an engine prelube period. ---------- Verify each DG starts and achieves: a. In ≤ 10 seconds, voltage ≥ 3785 V and frequency ≥ 58.8 Hz; and b. Steady state voltage ≥ ~~3785~~3980 V and ≤ ~~4400~~4340 V, and frequency ≥ ~~58.8~~59.2 Hz and ≤ ~~61.2~~60.8 Hz.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.19 (continued)	Verify on an actual or simulated loss of offsite power signal in conjunction with an actual or simulated Safety Injection signal: a. De-energization of emergency buses; b. Load shedding from emergency buses; and c. DG auto-starts from standby condition and: 1. energizes permanently connected loads in ≤ 10 seconds, 2. energizes auto-connected emergency loads through load sequencing timers, 3. achieves steady state voltage ≥ ~~3785~~3980 V and ≤ ~~4400~~4340 V, 4. achieves steady state frequency ≥ ~~58.8~~59.2 Hz and ≤ ~~61.2~~60.8 Hz; and 5. supplies permanently connected and auto-connected emergency loads for ≥ 5 minutes.	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.20	----------NOTE---------- All DG starts may be preceded by an engine prelube period. ---------- Verify when started simultaneously from standby condition, each DG achieves: a. In ≤ 10 seconds, voltage ≥ 3785 V and frequency ≥ 58.8 Hz; and b. Steady state voltage ≥ ~~3785~~3980 V and ≤ ~~4400~~4340 V, and frequency ≥ ~~58.8~~59.2 Hz and ≤ ~~61.2~~60.8 Hz.	In accordance with the Surveillance Frequency Control Program

Enclosure
Attachment 2
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3.8-10	3.8-10

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.8.1.1	Verify correct breaker alignment and indicated power availability for each required offsite circuit.	In accordance with the Surveillance Frequency Control Program
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. ---------- Verify each DG starts from standby conditions and achieves steady state voltage ≥ 3980 V and ≤ 4340 V, and frequency ≥ 59.2 Hz and ≤ 60.8 Hz.	In accordance with the Surveillance Frequency Control Program
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 of 2860 kW (nominal) and DG cooling system functions within design limits.	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.4	Verify each day tank contains a usable volume of ≥ 258 gal of fuel oil.	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.5	Check for and remove accumulated water from each day tank.	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.6	Verify the fuel oil transfer system operates to transfer fuel oil from storage tanks to the day tank.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
SR 3.8.1.7	----------NOTE---------- All DG starts may be preceded by an engine prelube period. ---------- Verify each DG starts from standby condition and achieves: a. In ≤ 10 seconds, voltage ≥ 3785 V and frequency ≥ 58.8 Hz; and b. Steady state voltage ≥ 3980 V and ≤ 4340 V, and frequency ≥ 59.2 Hz and ≤ 60.8 Hz.	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.8	----------NOTE---------- This Surveillance shall not normally be performed for automatic transfers in MODE 1 or 2. However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. ---------- Verify automatic and manual transfer of AC power sources from the normal offsite circuit to the alternate required offsite circuit and manual transfer from the alternate offsite circuit to the delayed access circuit.	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.9	----------NOTES---------- 1. This Surveillance shall not normally be performed in MODE 1 or 2. However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. 2. If performed with the DG synchronized with offsite power, it shall be performed at a power factor ≤ 0.9. ---------- 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 ≤ 63 Hz; b. Within 1.6 seconds following load rejection, the voltage is ≥ 3785 V and ≤ 4400 V; and c. Within 1.6 seconds following load rejection, the frequency is ≥ 58.8 Hz and ≤ 61.2 Hz.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.10	----------NOTE---------- If performed with DG synchronized with offsite power, testing shall be performed at a power factor ≤ 0.84. However, if grid conditions do not permit, the power factor limit is not required to be met. Under this condition, the power factor shall be maintained as close to the limit as practicable. ---------- Verify each DG does not trip and voltage is maintained ≤ 5096 V during and following a load rejection of 2860 kW (nominal).	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.11	----------NOTES---------- 1. All DG starts may be preceded by an engine prelube period. 2. This Surveillance shall not normally be performed in MODE 1, 2, 3, or 4. However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. ---------- Verify on an actual or simulated loss of offsite power signal: 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 in ≤10 seconds, 2. energizes auto-connected loads through auto-transfer sequencing timers, 3. maintains steady state voltage ≥ 3980 V and ≤ 4340 V, 4. maintains steady state frequency ≥ 59.2 Hz and ≤ 60.8 Hz; and 5. supplies permanently connected and auto-connected loads for ≥ 5 minutes.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
SR 3.8.1.12	----------NOTES---------- 1. All DG starts may be preceded by an engine prelube period. 2. This Surveillance shall not normally be performed in MODE 1 or 2. However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. ---------- Verify on an actual or simulated Safety Injection signal each DG auto-starts from standby condition and: a. In ≤ 10 seconds after auto-start and during tests, achieves voltage ≥ 3785 V and frequency ≥ 58.8 Hz; b. Achieves steady state voltage ≥ 3980 V and ≤ 4340 V, and frequency ≥ 59.2 Hz and ≤ 60.8 Hz; c. Operates for ≥ 5 minutes; d. Permanently connected loads are energized from the alternate offsite power source; and e. Emergency loads are auto-connected through the ESF load sequencing timers to the alternate offsite power source.	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.13	Verify each DG's automatic trips are bypassed when the diesel engine trip cutout switch is in the cutout position and the DG is aligned for automatic operation except: a. Engine overspeed; b. Generator differential current; and c. Low lube oil pressure;	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.14	----------NOTES---------- 1. Momentary transients outside the load and power factor ranges do not invalidate this test. 2. If performed with DG synchronized with offsite power, testing shall be performed at a power factor ≤ 0.84. However, if grid conditions do not permit, the power factor limit is not required to be met. Under this condition, the power factor shall be maintained as close to the limit as practicable. ---------- Verify each DG operates for ≥ 24 hours: a. For ≥ 2 hours loaded at 2860 kW (nominal); and b. For the remaining hours of the test loaded at 2750 kW (nominal); and c. Verify DG cooling system functions within design limits.	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.15	----------NOTES---------- 1. This Surveillance shall be performed within 5 minutes of shutting down the DG after the DG has operated ≥ 2 hours loaded at 2750 kW (nominal). Momentary transients outside of load range do not invalidate this test. 2. All DG starts may be preceded by an engine prelube period. ---------- Verify each DG starts and achieves: a. In ≤ 10 seconds, voltage ≥ 3785 V and frequency ≥ 58.8 Hz; and b. Steady state voltage ≥ 3980 V and ≤ 4340 V, and frequency ≥ 59.2 Hz and ≤ 60.8 Hz.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
SR 3.8.1.16	----------NOTE---------- This Surveillance shall not normally be performed in MODE 1, 2, 3, or 4. However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. ---------- Verify each DG: a. Synchronizes with offsite power source while loaded with emergency loads upon a simulated restoration of offsite power; b. Transfers loads to offsite power source; and c. Returns to ready-to-load operation.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
SR 3.8.1.17	----------NOTE---------- This Surveillance shall not normally be performed in MODE 1, 2, 3, or 4. However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. ---------- Verify, with a DG operating in test mode and connected to its bus, an actual or simulated Safety Injection signal overrides the test mode by: a. Opening the auxiliary transformer breaker; and b. Automatically sequencing the emergency loads onto the DG.	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.18	----------NOTE---------- This Surveillance shall not normally be performed in MODE 1, 2, 3, or 4. However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. ---------- Verify each ESF and auto-transfer load sequencing timer is within its limits.	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.19	----------NOTES---------- 1. All DG starts may be preceded by an engine prelube period. 2. This Surveillance shall not normally be performed in MODE 1, 2, 3, or 4. However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. ----------	(continued)

Unit 1 - Amendment No. ~~135~~,~~174~~,~~200~~,
Unit 2 - Amendment No. ~~135~~,~~176~~,~~201~~,

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.19 (continued)	Verify on an actual or simulated loss of offsite power signal in conjunction with an actual or simulated Safety Injection signal: a. De-energization of emergency buses; b. Load shedding from emergency buses; and c. DG auto-starts from standby condition and: 1. energizes permanently connected loads in ≤ 10 seconds, 2. energizes auto-connected emergency loads through load sequencing timers, 3. achieves steady state voltage ≥ 3980 V and ≤ 4340 V, 4. achieves steady state frequency ≥ 59.2 Hz and ≤ 60.8 Hz; and 5. supplies permanently connected and auto-connected emergency loads for ≥ 5 minutes.	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.20	----------NOTE---------- All DG starts may be preceded by an engine prelube period. ---------- Verify when started simultaneously from standby condition, each DG achieves: a. In ≤ 10 seconds, voltage ≥ 3785 V and frequency ≥ 58.8 Hz; and b. Steady state voltage ≥ 3980 V and ≤ 4340 V, and frequency ≥ 59.2 Hz and ≤ 60.8 Hz.	In accordance with the Surveillance Frequency Control Program

Enclosure
Attachment 3
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Technical Specification Bases Pages Markups

(For Information Only)

BASES

BACKGROUND (continued)

(DG) Start Instrumentation"). After the DG has started, it will automatically tie to its respective bus after offsite power is tripped as a consequence of ESF bus undervoltage or degraded voltage, independent of or coincident with an SI signal. The DGs will also start and operate in the standby mode without tying to the ESF bus on an SI signal alone. Following the trip of offsite power, an undervoltage signal strips nonpermanent loads from the ESF bus. When the DG is tied to the ESF bus, loads are then sequentially connected to their respective ESF bus by the load sequencing timers (ESF timers). The sequencing logic controls the permissive and starting signals to motor breakers to prevent overloading the DG. Each ESF component is provided with its own load sequencing timer.

In the event of a loss of preferred power, the ESF electrical loads are automatically connected to the DGs in sufficient time to provide for safe reactor shutdown and to mitigate the consequences of a Design Basis Accident (DBA) such as a loss of coolant accident (LOCA).

Certain required unit loads are returned to service in a predetermined sequence in order to prevent overloading the DG in the process. Within 1 minute after the initiating signal is received, all loads needed to recover the unit or maintain it in a safe condition are returned to service.

Ratings for the six DGs satisfy the requirements of Safety Guide 9, March 1971 (Ref.3). ~~The continuous service rating of each DG is 2600 kW with 10% overload permissible for up to 2 hours in any 24 hour period.~~

The net electrical output ratings of the DGs are as follows:

a. 2600 kW at 0.8 Power Factor (PF) for continuous operation; and

b. 2750 kW for overload operation (2000 hours in a 1 year period); and

c. 2860 kW for overload operation (2 hours in a 24 hour period); and

d. 3056 kW for overload operation (30 minute rating)

The ESF loads that are powered from the 4.16 kV ESF buses are listed, in part, ~~in Reference 2~~ in UFSAR Chapter 8 (Ref. 2).

(Continued)

BASES

SURVEILLANCE REQUIREMENTS

The AC sources are designed to permit inspection and testing of all important areas and features, especially those that have a standby function, in accordance with 10 CFR 50, Appendix A, 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 with the recommendations of NUREG-1431, Revision 1 ~~Regulatory Guide 1.9 Rev. 3~~ (Ref. 15) and Regulatory Guide 1.108, Revision 1 (Ref. 9) for the types of surveillance tests and surveillance frequencies, ~~Regulatory Guide 1.108 (Ref. 9),~~ and Regulatory Guide 1.137, Revision 1 (Ref. 10), as addressed in the FSAR.

Where the SRs discussed herein specify voltage and frequency tolerances, the following is applicable. The minimum steady state output voltage of ~~3785~~ 3980 V is ~~consistent with~~greater than the second level undervoltage relay allowable values. 3980 V is 95.7 percent of the nominal 4160 V output voltage. This value, which is 240 V above the minimum utilization voltage specified in ANSI C84.1 (Ref. 21), allows for voltage drop to the terminals of 4000 V motors whose minimum operating voltage is specified as 90 percent or 3600 V. ~~This is the~~The minimum steady state voltage ~~needed~~ on the ~~4.16 kV~~ 4160 V ~~vital~~Class 1E buses ~~to~~ ensures adequate ~~4.16 kV~~ 4160 V, 480 V and 120 VAC levels. The specified maximum steady state output voltage of ~~4400~~ 4340 V is ~~equal to~~less than the maximum operating voltage for 4000 V motors specified in ANSI C84.1 (4400 V). The maximum steady state output voltage of ~~4400~~ 4340 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 ± 2% of the 60 Hz nominal frequency and are derived from the recommendations given in Safety Guide 9, March 1971 (Ref. 3) Position C.4.~~

The specified minimum and maximum steady state voltages and frequencies for this Surveillance are 3980 V and 4340 V and 59.2 Hz and 60.8 Hz, respectively, which are equivalent to 4160 V ± 4.33% and 60 Hz ± 1.33%. The maximum loading conditions associated with the voltage and frequency limits must be bounded by this Surveillance in order to verify that the steady-state loading of the Class 1E 4160 V ESF buses under maximum voltage (4340 V) and frequency (60.8 Hz) conditions following a postulated DBA does not exceed the Safety Guide 9 (Ref. 3) Regulatory Position C.2 limit for predicted loads, which includes derating the diesel generators due to temperature effects.

(Continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

In accordance with the guidance provided in Safety Guide 9, March 1971 (Ref. 3), Regulatory Position C.4, where steady state conditions do not exist (i.e., transients), the frequency range should be restored to within ± 2% of the 60 Hz nominal frequency (58.8 Hz to 61.2 Hz) and the voltage range should be restored to within ±10% of the 4160 V nominal voltage (3740 V to 4580 V). The timed start is satisfied when the DG achieves at least 3785 V and 58.8 Hz. At these values, the DG output breaker permissives are satisfied, and on detection of bus undervoltage or loss of power, the DG breakers would close, reenergizing its respective ESF bus.

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 Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program.

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 to maintain the unit in a safe shutdown condition. SRs 3.8.1.2 and 3.8.1.7 satisfy Regulatory Guide 1.108 (Ref. 9), Regulatory Position C.2.c (1) by demonstrating proper DG startup and verifying that the required voltage and frequency are automatically attained within acceptable limits and time. This test should also verify that the components of the diesel generator unit required for automatic startup are operable.

To minimize the wear on moving parts that do not get lubricated when the engine is not running, these SRs are modified by a Note (Note 2 for SR 3.8.1.2) to indicate that all DG starts for these Surveillances may be preceded by an engine prelube period and, for SR 3.8.1.2, followed by a warmup period prior to loading.

(Continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.2 and SR 3.8.1.7 (continued)

For the purposes of SR 3.8.1.2 and SR 3.8.1.7 testing, the ~~DGS~~ DGs are started from standby conditions. Standby conditions for a DG means that the diesel engine coolant and oil temperature is being maintained consistent with manufacturer recommendations of equal to or greater than 90°F but less than 175°F. For the purposes of this SR, the diesel generator start will be initiated using one of the following signals: 1) manual, 2) simulated loss of offsite power, and 3) safety injection actuation test signal.

SR 3.8.1.7 requires that the DG starts from standby conditions and achieves minimum required voltage and frequency within 10 seconds. The 10 second start requirement reflects the point during the DG's acceleration at which the DG is assumed to be able to accept load. The 10 second start requirement supports the assumptions of the design basis LOCA analysis in the FSAR, Chapter 15 (Ref. 5).

Since SR 3.8.1.7 requires a timed start, it is more restrictive than SR 3.8.1.2, and it may be performed in lieu of SR 3.8.1.2. This is the intent of Note 1 of SR 3.8.1.2.

SR 3.8.1.2 and SR 3.8.1.7 require the DG achieves steady state voltage and frequency within limits. Actual steady state operation is expected to achieve a level of stability closer to the nominal 60 Hz value. In addition to the SR requirements, the time for the DG to reach steady state operation is periodically monitored and the trend evaluated to identify degradation of governor and voltage regulator performance.

The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program.

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. 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. SR 3.8.1.3 satisfies Regulatory Guide 1.108 (Ref. 9), Regulatory Position C.2.c.(2), by demonstrating that the DG is capable of carrying the expected maximum load following a design basis accident for an interval of not less than one hour and that the DG cooling system functions within design limits. The manufacturer recommendation for jacket water outlet temperature is less than 185°F and lube oil temperature is less than 195°F.

(Continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.3 (continued)

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 the 1.0 is an operational limitation to ensure circulating currents are minimized. The test load ~~band~~ criterion is provided to avoid ~~routine overloading of the DG~~ exceeding vendor ratings. The test load criterion is 2860 kW (nominal), less instrument uncertainty, a test band and diesel generator derating. This criterion will load the DG at a load greater than the calculated worst-case maximum steady state load as determined by the latest DG steady state loading analyses, up to the 2-hours in a 24 hour period rating. OPERATION ~~within the load range of 90% to 100% of rated full load without anomalies~~ as near to the 2-hour rating as practical without exceeding the DG rating will provide adequate assurance of the machine's ability to carry 100% of rated full load if required.

The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program.

This SR is modified by four 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 transients, because of changing bus loads, do not invalidate this test. Similarly, momentary power factor transients above the limit do not invalidate the test. Note 3 satisfies Regulatory Guide 1.108 (Ref. 9), Regulatory Positions C.1.b.(1) and C.2.b, in part, by requiring the redundant DG units to be tested independently (nonconcurrently). Note 3 indicates that this Surveillance should be conducted on only one DG at a time per unit 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)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.4

This SR provides verification that the level of fuel oil in the day tank is a contained quantity sufficient for DG operation at full load for a nominal one-hour period. One hour is adequate time for an operator to take corrective action to restore the fuel oil supply to the affected day tank. ~~The level is expressed as an equivalent volume in gallons.~~ Each DG shall be equipped with a day tank whose capacity is sufficient to maintain at least 60 minutes of operation. The volume of fuel required is equal to the usable minimum volume of 258 gallons plus the un-usable volume (which is slightly different for each day tank) and the amount of fuel remaining in the DFO Priming Tanks at the low level alarm setpoint. This volume supports one hour of DG operation which is sufficient to supply the DG loading at 2750 kW of the Class 1E 4160 V ESF buses under worst-case conditions of voltage (4340 V) and frequency (60.8 Hz) following a postulated DBA, plus additional fuel volume margin. The day tank low level alarm setpoint, including instrument uncertainty, is such that annunciation is provided prior to reaching this fuel oil level in the day tank.

The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program. ~~Additional assurance of sufficient day tank contained volume is provided by a low level alarm.~~

SR 3.8.1.5

Microbiological fouling is a major cause of fuel oil degradation. There are numerous bacteria 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 eliminates the necessary environment for bacterial survival. 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 breakdown of the fuel oil by bacteria. Frequent checking for and removal of accumulated water minimizes fouling and provides data regarding the watertight integrity of the fuel oil system. The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program. The presence of water does not necessarily represent failure of this SR, provided the accumulated water is removed during the performance of this Surveillance.

(Continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.6

This Surveillance demonstrates that each required fuel oil transfer pump operates and transfers fuel oil from the fuel oil storage tanks to each day tank. SR 3.8.1.6 satisfies Regulatory Guide 1.108 (Ref. 9), Regulatory Position C.2.a.(7), by demonstrating that the engine will perform properly if switching from one fuel oil supply system to another. This is a part of the normal operating procedure to satisfy the 7-day storage requirement. This is required to support continuous operation of standby power sources. This Surveillance provides assurance that the fuel oil transfer pump is OPERABLE, the fuel oil piping system is intact, the fuel delivery piping is not obstructed, and that controls are configured such that each unit will preferentially receive fuel from a different storage tank while using the other unit's preferred storage as its backup storage.

The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program.

SR 3.8.1.7

See SR 3.8.1.2.

SR 3.8.1.8

Transfer of each 4.16 kV ESF bus power supply from the normal offsite circuit to the alternate offsite circuit, which is the immediate access 230 kV, demonstrates the OPERABILITY of the alternate circuit distribution network to power the shutdown loads. Transfer of each 4.16 kV ESF bus power supply from the alternate offsite circuit (immediate access 230 kV) to the delayed access circuit (500 kV circuit) demonstrates the ability of the delayed access circuit. The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program.

This SR is modified by a Note. The reason for the Note is that, during operation with the reactor critical, performance of this SR for automatic bus transfers could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. The restriction applies only to automatic bus transfers where a unit trip and reactor trip will occur.

(Continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.8 (continued)

This restriction from normally performing the Surveillance in MODE 1 or 2 is further amplified to allow the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g., post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed Surveillance, a successful Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a plant shutdown and startup to determine that plant safety is maintained or enhanced when the Surveillance is performed in MODE 1 or 2. Risk insights or deterministic methods may be used for this assessment. This restriction does not apply to manual bus transfers which are a normal action required during a plant startup or shutdown.

Preplanned maintenance that would require the performance of this SR to demonstrate operability following the maintenance shall only be performed in Modes 3, 4, 5, or 6.

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 load without exceeding predetermined voltage and frequency and while maintaining a specified margin to the overspeed trip. SR 3.8.1.9 satisfies Safety Guide 9, March 1971, RP C.4, in part, and RG 1.108, Revision 1, RP C.2.a.(4), in part, by demonstrating proper operation during DG load rejection, including a test of the loss of the largest single load. The single largest DG load is a centrifugal charging pump (CCP), which is powered by a motor rated at 600 hp. The CCP has a maximum electrical demand based on the maximum expected horsepower input, maximum operational frequency and motor efficiency of approximately 542 kW. For conservatism, a load reject equal to or greater than 600 kW is used to bound this demand under worst case conditions. ~~The CCP has a maximum demand, based on the maximum expected horsepower input and motor efficiency, of 515 kW.~~ This Surveillance may be accomplished by:

(Continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.9 (continued)

a. Tripping the DG output breaker with the DG carrying greater than or equal to its associated single largest post-accident load while paralleled to offsite power, or while solely supplying the bus; or

b. Tripping its associated single largest post-accident load with the DG solely supplying the bus.

c. Simultaneously tripping a combination of loads equal to or greater than the DG's associated single largest post-accident load with the DG solely supplying the bus.

The ~~2.4~~1.6 seconds specified is equal to ~~60~~40% of a typical 4 second load sequence interval associated with sequencing of the largest load. The specified minimum and maximum voltage and frequencies for SR 3.8.1.9 are 3785 V and 4400 V and 58.8 Hz and 61.2 Hz, respectively, which corresponds to 4160 V + 5.77%, - 9% and 60 Hz ± 2%. These values satisfy the voltage and frequency recovery recommendations given in Safety Guide 9, March 1971 (Ref. 3), Regulatory Position C.4. 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, while SR 3.8.1.9.b and SR 3.8.1.9.c are transient ~~steady state~~ voltage and frequency values to which the system must recover following load rejection. The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program.

This SR is modified by two Notes. The reason for Note 1 is that during operation with the reactor critical, performance of this SR could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. This restriction from normally performing the Surveillance in MODE 1 or 2 is further amplified to allow the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g., post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed Surveillance, a successful Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a plant shutdown and startup to determine that plant

(Continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.9 (continued)

safety is maintained or enhanced when the Surveillance is performed in MODE 1 or 2. Risk insights or deterministic methods may be used for this assessment.

Preplanned maintenance that would require the performance of this SR to demonstrate operability following the maintenance shall only be performed in Modes 3, 4, 5, or 6.

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 must be performed using a power factor ≤ 0.9 lagging. This power factor is chosen to be representative of the single largest load used during the performance of this Surveillance.~~actual design basis inductive loading that the DG would experience.~~

SR 3.8.1.10

This Surveillance demonstrates the DG's capability to reject a full load without overspeed tripping or exceeding the predetermined voltage limits. This Surveillance satisfies Regulatory Guide 1.108 (Ref. 9), Regulatory Position C.2.a.(4), in part, by demonstrating proper operation during DG load shedding, including a test of complete loss of load, and verifying that the voltage requirements are met and that the overspeed limits are not exceeded. 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 would experience following a full load rejection and verifies that the DG does not trip upon loss of the load. These acceptance criteria provide for DG damage protection. While the DG is not expected to experience this transient 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.

This SR is modified by a Note. The reason for the Note is to ensure that the DGs are tested under load conditions that are as close to design basis conditions as practicable.~~In order to ensure that the DG is tested under load conditions that are as close to design basis conditions as possible, testing must be performed using a power factor ≤ 0.87 lagging. This power factor is chosen to be representative of the actual design basis inductive loading that the DG would experience.~~

(Continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.10 (continued)

The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program.

SR 3.8.1.11

As required by Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(1), Regulatory Position C.2.a.(1), this Surveillance demonstrates proper startup operation by simulating loss of all a.c. voltage and demonstrate that the diesel generator unit can start automatically and attain the required voltage and frequency within acceptable limits and time the as designed operation of the standby power sources during loss of the offsite power (LOOP)source. This test verifies all actions encountered from the loss of offsite power, including shedding of the nonessential loads and energization of the emergency buses and respective loads from the DG. It further demonstrates the capability of the DG to automatically achieve the required voltage and frequency within the specified time.

The DG autostart time of 10 seconds is derived from requirements of the accident analysis to respond to a design basis accident. The 10 second requirement reflects the assumption of the accident analysis that the DG has reached the point in its acceleration where the DG is able to accept load. The Surveillance should be continued for a minimum of 5 minutes in order to demonstrate that all starting transients have decayed and stability is achieved. After energization of the loads, steady state voltage and frequency are required to be within their limits.

(Continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.11 (continued)

The requirement to verify the connection and power supply of permanent and auto-connected loads is intended to satisfactorily show the relationship of these loads to the DG loading logic. The permanently connected loads are the Class 1E 480 VAC buses. The permanently connected loads do not receive a load shed signal. In addition, the containment fan cooler units do not receive a load shed signal but are de-energized when their motor contactors drop out on undervoltage. The permanently connected loads are re-energized when the DG breaker closes to energize the bus. The auto-connected loads are those loads that are energized via their respective sequencing timer. In certain circumstances, many of these loads cannot actually be connected or loaded without undue hardship or potential for undesired operation. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the DG systems 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.

The specified minimum and maximum steady state voltages and frequencies for this Surveillance are 3980 V and 4340 V and 59.2 Hz and 60.8 Hz, respectively, which are equivalent to 4160 V ± 4.33% and 60 Hz ± 1.33%. The maximum loading conditions associated with the voltage and frequency limits must be bounded by this Surveillance in order to verify that the steady-state loading of the Class 1E 4160 V ESF buses under maximum voltage (4340 V) and frequency (60.8 Hz) conditions following a postulated DBA does not exceed the Safety Guide 9 (Ref. 3) Regulatory Position C.2 limit for predicted loads, which includes derating the diesel generators due to temperature effects.

The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program.

(Continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.11 (continued)

This SR is modified by two Notes. The reason for Note 1 is to minimize wear and tear on the ~~DGS~~ DGs during testing. For the purpose of this testing, the ~~DGS~~ DGs must be started from standby conditions, that is, with the engine coolant and oil temperature maintained consistent with manufacturer recommendations of equal to or greater than 90°F but less than 175°F. The reason for Note 2 is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. This restriction from normally performing the Surveillance in MODE 1 or 2 is further amplified to allow portions of the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g., post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed partial Surveillance, a successful partial Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the partial Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a plant shutdown and startup to determine that plant safety is maintained or enhanced when portions of the Surveillance are performed in MODE 1 or 2. Risk insights or deterministic methods may be used for this assessment.

Preplanned maintenance that would require the performance of this SR to demonstrate operability following the maintenance shall only be performed in Modes 5 or 6.

(Continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.12

As required by Regulatory Guide 1.108 (Ref. 9), Regulatory Position C.2.a.(2), this Surveillance demonstrates proper operation for design accident loading-sequence to design-load requirements and verify that voltage and frequency are maintained within required limits.

This Surveillance demonstrates that the DG automatically starts and achieves stability by reaching the minimum required voltage and frequency within the specified time (10 seconds) from the Safety Injection actuation signal, and subsequently achieves steady state voltage and frequency, and operates for ≥ 5 minutes. The 5 minute period provides sufficient time to demonstrate stability.

The specified minimum and maximum steady state voltages and frequencies for this Surveillance are 3980 V and 4340 V and 59.2 Hz and 60.8 Hz, respectively, which are equivalent to 4160 V ± 4.33% and 60 Hz ± 1.33%. The maximum loading conditions associated with the voltage and frequency limits must be bounded by this Surveillance in order to verify that the steady-state loading of the Class 1E 4160 V ESF buses under maximum voltage (4340 V) and frequency (60.8 Hz) conditions following a postulated DBA does not exceed the Safety Guide 9 (Ref. 3) Regulatory Position C.2 limit for predicted loads, which includes derating the diesel generators due to temperature effects.

SR 3.8.1.12.d and SR 3.8.1.12.e ensure that permanently connected loads and emergency loads are energized from the offsite electrical power system on a Safety Injection signal without loss of offsite power. The emergency loads are the ESF loads.

(Continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.12 (continued)

The requirement to verify the connection of permanent and auto-connected loads to the immediate access 230 kV offsite power system is intended to satisfactorily show the relationship of these loads to the DG loading logic. For a description of the permanent and auto-connected loads, see SR 3.8.1.11 Bases. In certain circumstances, many of these loads cannot actually be connected or loaded without undue hardship or potential for undesired operation. In lieu of actual demonstration of 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 connection and loading sequence is verified.

The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program.

This SR is modified by two Notes. The reason for Note 1 is to minimize wear and tear on the ~~DGS~~ DGs during testing. For the purpose of this testing, the ~~DGS~~ DGs must be started from standby conditions, that is, with the engine coolant and oil temperature maintained consistent with manufacturer recommendations of equal to or greater than 90°F but less than 175°F. The reason for Note 2 is that during operation with the reactor critical, performance of this Surveillance could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. This restriction from normally performing the Surveillance in MODE 1 or 2 is further amplified to allow portions of the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g. post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed partial Surveillance, a successful partial Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the partial Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a plant shutdown and startup to determine that plant safety is maintained or enhanced when portions of the Surveillance are performed in MODE 1 or 2. Risk insights or deterministic methods may be used for this assessment.

(Continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.12 (continued)

Preplanned maintenance that would require the performance of this SR to demonstrate operability following the maintenance shall only be performed in Modes 3, 4, 5, or 6.

SR 3.8.1.13

This Surveillance demonstrates that DG noncritical protective functions are bypassed when the diesel engine trip cutout switch is in the cutout position and the DG is aligned for automatic operation. The noncritical trips include directional power, loss of field, breaker overcurrent, high jacket water temperature, and diesel overcrank. These 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. 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.

The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program.

SR 3.8.1.14

This surveillance is in response to ~~The refueling outage intent of~~ Regulatory Guide 1.108 (Ref. 9), ~~paragraph 2.a.(3),~~ Regulatory Position C.2.a.(3) requirements to demonstrate full-load-carrying capability for an interval of not less than 24 hours, of which 22 hours should be at a load equivalent to the continuous rating of the diesel generator and 2 hours at a load equivalent to the 2-hour rating of the DG. ~~requires demonstration 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 a load equivalent to 110% of the continuous duty rating and the remainder of the time at a load equivalent to 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 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. SR 3.8.1.14 verifies that the cooling system functions within design limits in accordance with Regulatory Guide 1.108 (Ref. 9), Regulatory Position C.2.a.(3). The manufacturer's recommendation for the jacket water temperature is less than 185°F and for the lube oil temperature is less than 195°F.

(Continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.14 (continued)

SR 3.8.1.14 contains test loading criterion of 2860 kW (nominal), which is the 2-hour out of 24 hours rating less instrument uncertainty, a test band and DG derating. This criterion will load the DG to as near to the 2-hour rating as practical without exceeding the DG rating and will demonstrate that the DGs have adequate endurance and margin at a test load greater than the maximum expected steady state load at worst-case conditions of voltage and frequency. The 2-hour test load, which is less than the DG 2-hour rating, is an exception to Regulatory Guide 1.108, Regulatory Position C.2.a.(3).

SR 3.8.1.14 contains a test loading criterion of 2750 kW (nominal) for the remaining 22-hour portion of the DG 24-hour full-load-carrying capability test. This criterion will load the DG at a load greater than the calculated worst-case maximum steady load up to the 2000- hour/year rating. The 22-hour test load, which is greater than the DG continuous rating, complies with Regulatory Guide 1.108, Regulatory Position C.2.a.(3).

The minimum loading for this Surveillance demonstrates that the DGs can run continuously at a load greater than the maximum expected steady state load at the worst-case conditions of voltage and frequency.~~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 of ≤ 0.87 lagging. This power factor is chosen to be representative of the actual design basis inductive loading that the DG would experience.~~ The load ~~band is~~criteria are established ~~provided~~ to avoid exceeding vendor ratings~~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 Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program.

This Surveillance is modified by Notes. Note 1 ~~which~~ states that momentary transients due to changing bus loads do not invalidate this test. Note 2 ensures that the DGs are tested under load conditions that are as close to design basis conditions as practicable.~~Similarly, momentary power factor transients above the power factor limit will not invalidate the test.~~

Administrative controls for performing this SR in MODES 1 or 2, with the DG paralleled to an offsite power supply, ensure or require that:

(Continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.14 (continued)

a. Weather conditions are conducive to performing this SR.

b. The offiste power supply and switchyard conditions support performing this SR, including communicating with the transmission group responsible for the 230 kV and 500 kV switchyards to ensure that, during the DG testing, vehicle access to these switchyards is controlled and no elective maintenance or testing on the offsite power sources is performed potentially affecting:

- 230 kV and 500 kV systems (Exceptions are to be authorized by Operations Management)
- Either units' 12 kV startup bus
- Transformers or insulators

c. No equipment or systems assumed to be available for supporting the performance of the SR are removed from service.

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 minimum required voltage and frequency within 10 seconds. SR 3.8.1.15 is in response to Regulatory Guide 1.108 (Ref. 9), Regulatory Position C.2.a.(5) requirements to demonstrate functional capability at full-load temperature conditions. SR 3.8.1.15 is an approved exception to Regulatory Guide 1.108 (Ref. 9), Regulatory Position C.2.a.(5) in that the test does not fully comply with the regulation. The 10 second time is derived from the requirements of the accident analysis to respond to a design basis accident. SR 3.8.1.15 requires the DG achieves steady state voltage and frequency within limits.

The specified minimum and maximum steady state voltages and frequencies for this Surveillance are 3980 V and 4340 V and 59.2 Hz and 60.8 Hz, respectively, which are equivalent to 4160 V ± 4.33% and 60 Hz ± 1.33%. The maximum loading conditions associated with the voltage and frequency limits must be bounded by this Surveillance in order to verify that the steady-state loading of the Class 1E 4160 V ESF buses under maximum voltage (4340 V) and frequency (60.8 Hz) conditions following a postulated DBA does not exceed the Safety Guide 9 (Ref. 3) Regulatory Position C.2 limit for predicted loads, which includes derating the diesel generators due to temperature effects.

(Continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.15 (continued)

(Ref. 3) Regulatory Position C.2 limit for predicted loads, which includes derating the diesel generators due to temperature effects.

Actual steady state operation is expected to achieve a level of stability closer to the nominal 60 Hz value. The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program.

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 test data and 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~~ Regulatory Position C.2.a.(6), this Surveillance ensures that the manual synchronization and load transfer from the DG to the offsite source can be made and the DG can be returned to ready to load status when offsite power is restored. It also ensures that the autostart 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 sequencing timers are reset.

The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program.

(Continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.16 (continued)

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. This restriction from normally performing the Surveillance in MODE 1 or 2 is further amplified to allow the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g., post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed Surveillance, a successful Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a plant shutdown and startup to determine that plant safety is maintained or enhanced when the Surveillance is performed in MODE 1 or 2. Risk insights or deterministic methods may be used for this assessment.

Preplanned maintenance that would require the performance of this SR to demonstrate operability following the maintenance shall only be performed in Modes 5 or 6.

SR 3.8.1.17

SR 3.8.1.17 satisfies Regulatory Guide 1.108 (Ref. 9), Regulatory Position C.2.a.(8) by demonstrating that the capability of the diesel generator unit to supply emergency power within the required time is not impaired during periodic testing.

Demonstration of the test mode override ensures that the DG availability under accident conditions will not be compromised as the result of testing. A Safety Injection signal, received while the DG is operating in a test mode, results in the auxiliary breaker opening and the emergency loads automatically sequencing onto the DG.

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.

The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the

(Continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.17 (continued)

Surveillance Frequency Control Program.

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. This restriction from normally performing the Surveillance in MODE 1 or 2 is further amplified to allow portions of the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g., post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed partial Surveillance, a successful partial Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the partial Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a plant shutdown and startup to determine that plant safety is maintained or enhanced when portions of the Surveillance are performed in MODE 1 or 2. Risk insights or deterministic methods may be used for this assessment.

Preplanned maintenance that would require the performance of this SR to demonstrate operability following the maintenance shall only be performed in Modes 5 or 6.

SR 3.8.1.18

Under accident and loss of offsite power conditions, loads are sequentially connected to the bus by load sequencer timers. The sequencing logic controls the permissive and starting signals to motor breakers to prevent overloading of the DGs due to high motor starting currents. The load sequence time interval tolerances ensure 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. The timing limits for the load sequence timers are found in table B3.8.1-1 (ESF Timers) and table B3.8.1-2 (Auto transfer Timers).

With an ESF timer found to be outside the range of acceptable settings, the corresponding DG shall be declared inoperable in MODES 1, 2, 3, and 4, and the corresponding CONDITION followed. With an Auto Transfer timer found to be outside the range of acceptable settings, the corresponding DG shall be declared inoperable for all MODES. This action is necessary only for that time required to open the breaker on

(Continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.18 (continued)

the affected load.

The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program.

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. This restriction from normally performing the Surveillance in MODE 1 or 2 is further amplified to allow the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g., post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed Surveillance, a successful Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a plant shutdown and startup to determine that plant safety is maintained or enhanced when the Surveillance is performed in MODE 1 or 2. Risk insights or deterministic methods may be used for this assessment.

Preplanned maintenance that would require the performance of this SR to demonstrate operability following the maintenance shall only be performed in Modes 5 or 6.

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 a loss of offsite power actuation test signal in conjunction with a Safety Injection signal. In lieu of actual demonstration of 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 connection and loading sequence is verified.

(Continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.19 (continued)

The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program.

This Surveillance was established based upon NUREG-1431, Volume 1, Revision 1 (Ref. 15) and Regulatory Guide 1.9, Revision 3, which includes a combined Safety Injection Actuation Signal (SIAS) and Loss of Offsite Power (LOOP) Test. DCPP is not committed to Regulatory Guide 1.9, Revision 3. This test is not required by Regulatory Guide 1.108, Revision 1.

The specified minimum and maximum steady state voltages and frequencies for this Surveillance are 3980 V and 4340 V and 59.2 Hz and 60.8 Hz, respectively, which are equivalent to 4160 V ± 4.33% and 60 Hz ± 1.33%. The maximum loading conditions associated with the voltage and frequency limits must be bounded by this Surveillance in order to verify that the steady-state loading of the Class 1E 4160 V ESF buses under maximum voltage (4340 V) and frequency (60.8 Hz) conditions following a postulated DBA does not exceed the Safety Guide 9 (Ref. 3) Regulatory Position C.2 limit for predicted loads, which includes derating the diesel generators due to temperature effects.

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 temperature maintained consistent with manufacturer recommendations for DGs of equal to or greater than 90°F but less than 175°F. The reason for Note 2 is that the performance of the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. This restriction from normally performing the Surveillance in MODE 1 or 2 is further amplified to allow portions of the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g., post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed partial Surveillance, a successful partial Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the partial Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a plant shutdown and startup to

(Continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.19 (continued)

determine that plant safety is maintained or enhanced when portions of the Surveillance are performed in MODE 1 or 2. Risk insights or deterministic methods may be used for this assessment.

Preplanned maintenance that would require the performance of this SR to demonstrate operability following the maintenance shall only be performed in Modes 5 or 6.

SR 3.8.1.20

This Surveillance demonstrates that the DG starting independence has not been compromised. This Surveillance satisfies the Regulatory Guide 1.108 (Ref. 9), Regulatory Position C.2.b. requirement to start the redundant DG units simultaneously to help identify certain common failure modes undetected in single DG unit tests. Also, this Surveillance demonstrates that each DG ~~engine~~ can achieve minimum required voltage and frequency within the specified time when the DGs are started simultaneously.

The specified minimum and maximum steady state voltages and frequencies for this Surveillance are 3980 V and 4340 V and 59.2 Hz and 60.8 Hz, respectively, which are equivalent to 4160 V ± 4.33% and 60 Hz ± 1.33%. The maximum loading conditions associated with the voltage and frequency limits must be bounded by this Surveillance in order to verify that the steady-state loading of the Class 1E 4160 V ESF buses under maximum voltage (4340 V) and frequency (60.8 Hz) conditions following a postulated DBA does not exceed the Safety Guide 9, March 1971 (Ref. 3) Regulatory Position C.2 limit for predicted loads, which includes derating the diesel generators due to temperature effects.

The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program.

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 temperature maintained consistent with manufacturer recommendations of equal to or greater than 90°F but less than 175°F.

(Continued)

BASES

REFERENCES

1. 10 CFR 50, Appendix A, GDC 17.

2. FSAR, Chapter 8.

3. Safety Guide 9, "Selection of Diesel Generator Set Capacity for Standby Power Supplies", March 1971.

4. FSAR, Chapter 6.

5. FSAR, Chapter 15.

6. Regulatory Guide 1.93, Rev. 0, December 1974.

7. Generic Letter 84-15, "Proposed Staff Actions to Improve and Maintain Diesel Generator Reliability," July 2, 1984.

8. 10 CFR 50, Appendix A, GDC 18.

9. Regulatory Guide 1.108, Rev. 1, August 1977.

10. Regulatory Guide 1.137, Rev. 1, Oct 1979.

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

12. Generic Letter 94-01, "Removal of Accelerated Testing and Special Reporting Requirements for Emergency Diesel Generators," May 31, 1994.

13. Diesel Generator Allowed Outage Time Study, LA 44/43, October 4, 1989

14. License Amendment 44/43, October 4, 1989.

15. NUREG-1431, Revision 1 "Standard Technical Specifications Westinghouse Plants," dated April 1995.~~Regulatory Guide 1.9 Rev. 3, July 1993.~~

16. Not Used

17. License Amendment 166/167, April 20, 2004.

18. Calculation PRA 02-06, "Diesel Generator LAR for 14-day AOT."

19. License Amendment 174/176, September 28, 2004.

20. Operating Procedure OP J-2:VIII, "Guidelines for Reliable Transmission Service for DCPP."

21. ANSI C84.1-1977, "American National Standard for Electric Power Systems and Equipment - Voltage Ratings (60 Hz)"

(Continued)

Enclosure
Attachment 4
PG&E Letter DCL-14-018

FSAR Update Markup

(For Information Only)

(3) Sustained undervoltage or loss of voltage on any of the Class 1E 4.16-kV buses starts its respective diesel.

In each case, an independent set of signals or relays is applied to start the diesel for its bus. The first level undervoltage relay (initiating load shedding signal) for the startup offsite power circuit of each Class 1E 4.16-kV bus has inverse time characteristics and a slight delay upon complete voltage failure. The first level undervoltage relay has three select voltages and time delay settings, with the lowest being set at approximately 818-V.

The second level of undervoltage protection for each Class 1E 4.16-kV bus is set at approximately 3800-V. The protection consists of two relays for each bus having a two-out-of-two logic arrangement. Start of the respective diesel is delayed by 10 seconds. Bus loads are shed in 20 seconds, and bus transfer to the diesel generator takes place in 22 seconds. These timing features will prevent needless diesel starts during transient voltage dips, and provide adequate time delay for the startup offsite power circuit voltage to recover before transferring the bus to the diesel generator.

Should there be a loss of the startup offsite power circuit concurrent with the loss of onsite power (i.e., the main generating unit), the following events occur automatically, initiated by the first level of undervoltage protection:

(1) The 4.16-kV circuit breaker feeding the Class 1E 4.16-kV buses F, G, and H from the main generating unit is opened immediately.

(2) All three diesel generators for the unit are started and accelerated to ~~normal~~ minimum required frequency and ~~minimum~~ bus voltage in a period of less than 10 seconds.

(3) Should the startup offsite power circuit be restored before the diesel auto-transfer interlock relay actuates, the circuit breakers feeding the Class 1E 4.16-kV buses F, G, and H from the startup offsite power circuit are closed to restore power to the loads. First-level undervoltage relays have already shed loads. Loads, including certain ESF loads that may not have been operating, are started in the same manner and sequence as when fed from the diesel generator. The preferred power supply may be restored by reclosing the circuit breakers for the 230-kV transmission lines automatically and/or manually at Morro Bay switchyard under the control of the CAISO (refer to Section 8.2.3.2).

Should the startup offsite power circuit still be unavailable when the diesel generators have reached breaker close-in voltage, all circuit breakers from the standby power supply and startup offsite power circuit to these Class 1E 4.16-kV buses are given a trip signal independently to make sure they are open (the expected condition at this point). The startup offsite power circuit is automatically blocked from reclosing. The circuit breakers for all loads, except the 4.16-kV/480-V load center transformers, have already

The Class 1E 4.16kv/480-V load centers are left connected to their buses and are, therefore, energized first. Their initial load will consist of the momentary loads of the equipment that was left on, in addition to those initiated during the interruption. The net initial load on the load center consists of those loads that operate for a short time, such as motor operated valves, auxiliary lube oil pumps, etc., and the normal steady-state values for the remainder.

The starting loads of the larger motors that are started subsequently have also been included in the capabilities of the diesel generators.

8.3.1.1.3.3.5.3 4.16-kV Emergency Loads

In the event of an emergency shutdown of the main generating unit in the absence of the preferred power supply, the loads supplied by the diesel generator are applied in the following manner:

(1) In the absence of a SI signal, the first set of timing relays will operate and start the loads listed:

(a) The timing sequence and intervals are listed in Table 8.3-2. Notes for Table 8.3-2 and others in Section 8.3 are listed in Table 8.3-1.

(b) The ~~maximum steady-state load demand~~loading on the Class 1E 4.16-kV buses, immediately following a unit shutdown without a loss-of-coolant accident (LOCA), is as listed in Table 8.3-3.

(2) In the presence of a safety injection signal, the second set of timing relays operate and start the loads for the injection phase as listed in Table 8.3-4.

(3) The ~~maximum steady-state load demand~~loading on the Class 1E 4.16-kV buses immediately following a unit shutdown, concurrent with a LOCA, is as listed in Table 8.3-5.

(4) The loading~~s of~~ the Class 1E 4.16-kV/480-V load centers, following a unit shutdown, with or without a LOCA, ~~are listed in Table 8.3-6~~ is as detailed on Figures 8.3-6, 8.3-7 and 8.3-8. ~~These loads may not necessarily all be on simultaneously; however, to be conservative they are all considered in maximum demand.~~

8.3.1.1.3.3.6 General Design Criterion 18, 1971 – Inspection and Testing of Electric Power Systems

Surveillance tests and inspections are performed periodically to demonstrate the 4.16-kV system's design basis requirements are met. The controls for the 4.16-kV system are designed to be capable of periodic testing to assure operational and

8.3.1.1.4.2 System Description

The 480-V system is a three-phase, three-wire, ungrounded system that provides power to motors not greater than 350 hp, lighting and electric heating systems, battery chargers, and instrument and control systems.

The 480-V loads are served from the 4.16-kV buses through 4.16-kV/480-V transformers closely coupled to either metal-enclosed low voltage switchgear or to motor control centers. Five transformers in a duplex arrangement are provided for the non-Class 1E 480-V loads; two in the turbine building, two in the auxiliary building, and one at the intake structure. Three additional transformers, connected radially, are provided for the Class 1E 480-V loads, and the units are isolated from each other to maintain separation for the redundant Class 1E loads (refer to Figures 1.2-6, 1.2-8, 1.2-14, 1.2-16, 1.2-18, 1.2-20, 8.3-6, 8.3-7, and 8.3-8).

8.3.1.1.4.2.1 Maximum Demand

The ~~maximum demands~~ loading on the Class 1E 480-V load centers immediately following a unit shutdown is as detailed on Figures 8.3-6, 8.3-7 and 8.3-8. About 40 minutes after a major accident, the manual change-over of certain vital bus loads to support the recirculation phase would be completed.

8.3.1.1.4.2.2 Pressurizer Equipment Power Supplies

Pressurizer equipment power supplies are designed to meet the requirements of GDC 17, 1971 and NUREG-0737 (Reference 2) in the event of loss of offsite power. For further discussion of pressurizer equipment, refer to Section 5.5.9.

8.3.1.1.4.2.2.1 Pressurizer Heaters

The four pressurizer heater groups are normally connected to non-Class 1E 480-V power sources. All of the four pressurizer heater groups can be supplied with power from the offsite power sources when they are available.

When offsite power is not available, power can be provided to two out of four heater groups from the emergency power system (refer to Section 8.3.1.1.6) through Class 1E buses G and H (refer to Figure 8.3-19). Sufficient power (150 kW) is available from the Class 1E buses to energize enough heaters to maintain natural circulation at hot standby conditions. Redundancy is provided by supplying the two groups of heaters from the different Class 1E buses. The ability to supply emergency power to the heaters minimizes a potential loss of subcooling in the reactor coolant system after a loss of offsite power.

Transfer of pressurizer heater power supplies can be performed manually (in accordance with operating procedures) in less than 60 minutes using manual transfer switches located at the 100-foot elevation in the auxiliary building. Since the pressurizer

Section III.J – Emergency Lighting: Emergency lighting or battery operated lights (BOLs) are provided in areas where operation of the EDG system may be required to safely shut down the Unit following a fire.

Section III.L – Alternative and Dedicated Shutdown Capability: Safe shutdown capabilities are provided in the control room and at an alternate location via the hot shutdown panel or locally at the EDG, for equipment powered by the EDGs required for the safe shutdown of the plant following a fire event.

8.3.1.1.6.1.13 Safety Guide 9, March 1971 – Selection of Diesel Generator Set Capacity for Standby Power Supplies

The EDG system meets the applicable requirements of Safety Guide 9, March 1971 for steady state loading capability with one regulatory approved exception for DCPP:

(1) Exception to loading sequence frequency requirements of Safety Guide 9, March 1971, Position C.4 for MDAFW pump loading on EDGS 1-1, 1-3, 2-2, and 2-3 (Reference 30).

8.3.1.1.6.1.14 Regulatory Guide 1.97, Revision 3, May 1983 – Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant and Environs Conditions During and Following an Accident

The EDG instrumentation systems provide instrumentation in the control room to monitor EDG electrical status for post-accident instrumentation.

8.3.1.1.6.1.15 Regulatory Guide 1.108, Revision 1, August 1977 – Periodic Testing of Diesel Generator Units Used as Onsite Electric Power Systems at Nuclear Power Plants

As required by Regulatory Guide 1.108, Revision 1 (Reference 25), EDG testing simulates, where practical, the parameters of operation that would be expected if actual demand were to be placed on the system, as delineated in Technical Specification Bases 3.8.1.

There are ~~three~~ four regulatory approved exceptions to Regulatory Guide 1.108, Revision 1 for DCPP:

(1) Exception to testing frequency guidelines of Regulatory Position C.2.a based on compliance with the TS 5.5.18 Surveillance Frequency Control Program (Reference 27).

(2) Exception to EDG hot restart testing guidelines of Regulatory Position C.2.a (5) based on use of a modified hot restart test (Reference 28).

(3) Exceptions to Regulatory Positions C.2.a (9), C.2.d, C.2.e and C.3 based on compliance with NUMARC 93-01, Rev. 2, "Industry Guidelines for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants" (Reference 29).

(4) Exception to Regulatory Position C.2.a.(3) to demonstrate full-load-carrying capability for an interval of 2 hours at a load equivalent to the 2-hour rating of the diesel generator. ~~based upon 2 hour test at the 2-hour rating less instrument uncertainty~~ (Reference 32).

8.3.1.1.6.2 System Description

8.3.1.1.6.2.1 Diesel Generator Unit Description

Each diesel generator unit consists of a self-contained diesel engine directly connected to an alternating current generator, and the separate accessories needed for proper operation, all mounted on a common structural steel skid-type base. Mechanical power is provided by an 18 cylinder, vee configuration, four-cycle, 9-inch bore x 10-1/2 inch stroke, 12,024 cubic inch displacement, 3630 horsepower at 900 rpm, turbocharged and aftercooled, heavy-duty, stationary-type diesel engine.

The generator is rated at 3250 kVA, 0.8 PF, 4160 V, 60 Hz, three-phase, Y-connected, ungrounded, 80°C temperature rise, Class B insulation, with a drip-proof enclosure. The transient reactance is 14.1 percent, and the subtransient reactance is 8.1 percent. The exciter is a static series, boost-type exciter controlled by a static solid-state voltage regulator.

Five diesel engine generator units have been supplied by the ALCO Engine Division of White Industrial Power, Inc. The sixth diesel engine generator, EDG 2-3, was manufactured by G. E. Locomotives, the current owner and manufacturer of ALCO engines and locomotives at the time. In most respects, this EDG is similar to the other five EDGs; the differences and commercial grade dedication are documented in RPE M-6602. ALCO has supplied engine generator units to serve as emergency onsite standby power at several nuclear power plants. Among these are two ALCO units for the Palisades Nuclear Plant, which have the same engine as the first five DCPP engine generator units and a slightly smaller generator (2500kW continuous rating), and the two ALCO units for the Pilgrim I Nuclear Station, which has engines and generators that are identical to the first 5 at DCPP. Both of these nuclear power plants are in operation. In addition, the Salem 1 and 2 nuclear power plant has engine generator units with the same engines and generators as the first five DCPP engine generator units.

The EDG auxiliary systems; starting air system, ventilation system, cooling water system, lubrication system, fuel oil storage and transfer system, and compartment ventilation system are described in Sections 9.4.7, 9.5.4, 9.5.5, 9.5.6 and 9.5.7.

following a fire as defined by 10 CFR Part 50, Appendix R, Section III.J (refer to Section 9.5.3 and Appendix 9.5D).

Section III.L – Alternative and Dedicated Shutdown Capability: Safe shutdown capabilities are provided in the control room and at an alternate location via the hot shutdown panel or locally at the EDGs (refer to Section 7.4 for a discussion of the HSP and local EDG controls for the EDG system) as defined by 10 CFR Part 50, Appendix R, Section III.L. The ability to safely shut down the plant following a fire in any fire area is summarized in Section 4.0 of Appendix 9.5A and Appendix 9.5E.

8.3.1.1.6.3.13 Safety Guide 9, March 1971 – Selection of Diesel Generator Set Capacity for Standby Power Supplies

The diesel generators have a net continuous electrical output rating of 2600 kW at 0.8 power factor (PF), and ~~2752~~2750 kW ~~at 0.8 PF,~~ for 2000 hours per year. Short-term ratings of the diesel generators are ~~3000 kW at 0.8 PF for 2 hours per year,~~ 2860 kW ~~at 0.8 PF~~ for 2 hours per 24-hour period, and ~~3250~~3056 kW ~~at 0.8 PF~~ for 30 minutes. During the starting sequence for the safeguard loads, these machines can also carry short-time overloads. EDG loading meets the applicable criteria of Safety Guide 9, March 1971 (Reference 8). In accordance with the manufacturer's engine description and data sheet, the DGs are required to be derated ~~since~~if the inlet combustion air ~~air inlet temperature~~at the engine air intake filter is greater than 90°F and/or the jacket water temperature to the aftercooler inlet exceeds 160°F. The maximum air intake temperature for the diesel engines is determined ~~using~~based upon the highest hourly temperatures recorded at the Diablo Canyon site as documented in UFSAR Section 2.3~~highest hourly temperature measured by the onsite meteorological monitoring system and~~.2.2.2; ~~-~~adjusted for localized temperature effects.

Momentary loads ~~not included in Table 8.3-6~~ consisting principally of transient inrush currents, relay and solenoid short-time currents, starting currents to motors, and starting and operating currents for motor-operated valves are within the short-time capability of the electric power systems and the engine generators.

During a design basis-loading scenario with nominal timer interval, these machines maintain the electric power frequency within 5 percent, hold voltages to a minimum of 75 percent, and recover successfully by complying with Safety Guide 9, March 1971 (Reference 8) with the exception of Regulatory Position C.4. Safety Guide 9, March 1971, Regulatory Position C.4 specifies that during the EDG loading sequence the frequency should be restored to within 2 percent of nominal in less than 40 percent of each load sequence time interval. For AFW pump loading for EDGs 1-1, 1-3, 2-2, and 2-3, the frequency is restored to within 2 percent of nominal in less than 60 percent of the load sequence time interval. Based on test data, EDGs 1-1, 1-3, 2-2, and 2-3 have adequate margin to prevent overlapping of loads and meet the objectives of Safety Guide 9, March 1971, Regulatory Position C.4. This exception to Safety Guide 9, March 1971, was approved in License Amendments 211/213 dated March 29, 2012.

Automatic starting of the diesel generators is tested by removal of available power from its offsite source or its bus, simulating a bus undervoltage condition, or by initiating a test from the reactor protection system. The bus should transfer to the offsite source automatically, and the diesel generators should start and reach normal operating conditions if bus voltage is not restored within one second.

The absence of offsite power is simulated by opening the bus feeder breaker, simulating a bus undervoltage condition, or removal of its potential to the transfer control circuits. The test is repeated, with the diesel generator as the source and the loading sequence for the absence of safety injection. In the presence of a test safety injection signal (SIS), the test is repeated with the loading sequence for this condition.

Should there be an actual SIS while the diesel generator is paralleled with the unit auxiliary transformer during a test, the SIS signal would trip the unit auxiliary transformer (preventing a potential overload of the diesel generators), and diesel generator breaker closed prevents transfer of this bus to the startup source. Loads already running on this bus will continue to run, other loads will be started by their SIS timers, and any containment fan coolers running on high will automatically be restarted on low speed. ~~EDG test scope and test interval frequency meets the applicable criteria of Regulatory Guide 1.9, Revision 3 (Reference 25).~~

8.3.1.1.6.5 Instrumentation Applications

All operating conditions that could normally be expected to render the diesel generators incapable of responding to an automatic emergency start signal are alarmed in the control room. A "diesel generator trouble" annunciator is alarmed in the main control room whenever any of the following conditions occur:

(1) Diesel is in manual or test condition

(2) Loss of dc control power

(3) Low fuel level in day tank

(4) Low starting air pressure

(5) Shutdown relay tripped

(6) Lube oil system trouble

(7) Primary filter high differential pressure (Unit 2 only)

In addition to the diesel generator trouble annunciator window, there are alarm annunciator windows and data logger printouts for each of the above seven conditions.

16. Safety Guide 32, Use of IEEE Standard 308-1971 Criteria for Class 1E Electric Systems for Nuclear Power Generating Stations, August 1972.

17. Regulatory Guide 1.128, Revision 1, Installation Design and Installation of Large Lead Storage Batteries for Nuclear Power Plants, USNRC, October 1978.

18. IEEE 450-1995, Recommended Practice for Maintenance, Testing, and Replacement of Large Lead Storage Batteries for Generating Stations and Substations.

19. ICEA P-54-440, Cables in Open-Top Cable Trays, 1975.

20. 10 CFR 50.63, Station Blackout (SBO) Rule, Loss of All Alternating Current Power.

21. PG&E Letter DCL-92-084 to USNRC, Revised Response to Station Blackout, April 13, 1992.

22. Supplemental Safety Evaluation of PG&E Response to Station Blackout Rule (10 CFR 50.63) for Diablo Canyon, USNRC, (TAC Nos. M68537 and M68538), May 29, 1992.

23. NUMARC 87-00, Rev. 0, Guidelines and Technical Bases for NUMARC Initiatives Addressing Station Blackout at Light Water Reactors, November 1987.

24. Deleted in Revision 21.

25. ~~Regulatory Guide 1.9, Revision 3, Selection, Design, Qualification Testing, and Reliability of Diesel-Generator Units Used as Onsite Electric Power Systems at Nuclear Power Plants, July 1993~~ Regulatory Guide 1.108, Revision 1, August 1977 - Periodic Testing of Diesel Generating Units Used as Onsite Electric Power Systems at Nuclear Power Plants.

26. NRC (Mr. John Stolz) letter to PG&E (Mr. John Morrissey), dated November 22, 1977, Request for Additional Information – Diablo Canyon Nuclear Power Plant, Units 1 & 2.

27. License Amendments 200/201, Technical Specifications Change to Relocate Surveillance Test Intervals to a Licensee-Controlled Program, issued by the NRC, October 30, 2008.

28. License Amendments 105/104, Revision of Technical Specification for Diesel Generator Surveillance Testing, issued by the NRC, June 26, 1995.

29. License Amendments 135/135, Conversion to Improved Technical Specifications, issued by the NRC, May 28, 1999.

30. License Amendments 211/213, Revision to Technical Specification 3.8.1, "AC Sources – Operating," to Incorporate TSTF-163, Revision 2, issued by the NRC, March 29, 2012.

31. Regulatory Guide 1.155, Station Blackout, August 1988.

32. License Amendments XXX/YYY, Revision to Technical Specification 3.8.1, "AC Sources - Operating", issued by the NRC, LATER.

8.3.4 REFERENCE DRAWINGS

Figures representing controlled engineering drawings are incorporated by reference and are identified in Table 1.6-1. The contents of the drawings are controlled by DCPP procedures.

TABLE 8.3-1

NOTES FOR TABLES

(a) When supplied from the diesel generators, these motors are started automatically in the absence of a safety injection signal.

(b) The containment fan cooler unit (CFCU) motors are two-speed, rated 300 and 100 horsepower, and are fed from the vital 480-V load centers. The low speed is used under loss-of-coolant accident (LOCA) and auto-bus transfer conditions. There are five motors: two on bus F, two on bus G, and one on bus H.

(c) 1. The net EDG power factor is expected to be not less than the EDG rated power factor of 80 percent.

2. The power factor of the containment fan cooler units (CFCUs) at slow speed is 49.0 percent.

(d) Deleted

(e) Deleted

(f) For total time, add approximately 1 second for offsite power, and 10 seconds for the diesel generators.

(g) These loads are not required for nuclear safety but will probably operate at the same time to perform other important plant functions.

(h) These items are shared between Units 1 and 2.

(i) Two of the battery chargers are spares. Only one battery charger can be connected to a bus except during an abnormal operating condition which is time limited.

(j) The Technical Support Center, pressurizer heaters, containment hydrogen purge system fans, spent fuel pit pump, internal hydrogen recombiners, and charcoal filter preheater are manually controlled loads that can be added to the vital buses, providing the load demand has diminished and the diesel generators will not be overloaded.

(k) Containment spray is initiated after the time shown, provided "S" and "P" signals are present. All other components are started on the occurrence of an "S" signal.

(l) Deleted in Revision 7.

(m) Does not include loads that are cut off prior to diesel generator connection to bus.

(n) Only one group of control room air conditioning and vent equipment can be connected to a bus at one time.

(o) All tests conducted on all six diesel engine generator units, except as noted.

(p) The following Design Basis Accidents (DBAs) are considered in the EDG Load Study Analyses:

1. Event 1: Large Break Loss of Coolant Accident (LBLOCA)
2. Event 2: Small Break Loss of Coolant Accident (SBLOCA)
3. Event 3: Steam Generator Tube Rupture (SGTR)
4. Event 4: Steamline Rupture Inside Containment at Power
5. Event 5: Steamline Rupture Inside Containment at Hot Zero Power
6. Event 6: Feedwater Line Break (FWLB)
7. Event 7: Loss of Normal Feedwater (LONF)
8. Event 8: Loss of Offsite Power (LOOP)
9. Event 9: Station Blackout (SBO)

(q) The following Class 1E 4160 V ESF bus loading cases are considered for each of the postulated DBAs evaluated in the EDG Load Study Analyses. (Refer to Table 8.3-12 for maximum steady loads at 4340 V and 60.8 Hz):

1. Case 1: All EDGs operating energizing Class 1E 4160 V ESF buses (F, G & H) and supplying all associated accident loads with single component failure considerations
2. Case 2: The EDG associated with Class 1E 4160 V ESF bus F failed resulting in Class 1E 4160 V ESF bus F being deenergized, with accident loads supplied by Class 1E 4160 V buses G and H and associated EDGs

3. Case 3: The EDG associated with Class 1E 4160 V ESF bus G failed resulting in Class 1E 4160 V ESF bus G being deenergized, with accident loads supplied by Class 1E 4160 V buses F and H and associated EDGs

4. Case 4: The EDG associated with Class 1E 4160 V ESF bus H failed resulting in Class 1E 4160 V ESF bus H being deenergized, with accident loads supplied by Class 1E 4160 V ESF buses F and G and associated EDGs

5. Case 5: Failure of SSPS Train A will result in the EDG associated with Class 1E 4160 V Bus F to fail and to fail one train of safeguards equipment which will render certain pump/fan mechanical load demands to not load on a Class 1E 4160 V Bus.

6. Case 6: Failure of SSPS Train B will result in the EDG associated with Class 1E 4160 V Bus G to fail and to fail one train of safeguards equipment which will render certain pump/fan mechanical load demands to not load on a Class 1E 4160 V Bus.

TABLE 8.3-3

MAXIMUM STEADY STATE LOAD DEMAND - NO SAFETY INJECTION SIGNAL

Load	Quantity Per Unit	Rating (each)	Maximum BHP	Maximum Demand, kW[e] Bus 1F	Bus 2F	Bus 1G	Bus 2G	Bus 1H	Bus 2H
480-V load exclusive of containment fan coolers, fire pumps, momentary loads, and manually controlled loads[j]	3	1000 kVA		503	503	440	421	694	664
Load Center Transformer and Cable Losses				28	35	27	35	24	32
Component cooling water pumps	3	400 hp	435 hp	342	342	342	342	342	342
Auxiliary saltwater pumps	2	400 hp	435 hp	373	373	373	373	-	-
Auxiliary feedwater pumps[a]	2	600 hp	650 hp	394	394	-	-	394	394
Centrifugal charging pumps (CCP1 and CCP2)	2	600 hp	650 hp	525	525	525	525	-	-
Containment fan coolers[b]	5	100 hp	103 hp	170	170	170	170	85	85
Maximum demand on vital 4160-V buses (c.1)			kW =	2335	2342	1877	1865	1539	1517
			kVAR =	1345	1348	1123	1117	852	842
			kVA =	2695	2702	2187	2175	1759	1735

Diesel Generator Rating:
Continuous = 2600 kW 2000 Hour = 2750 kW 2 Hour = 3000 kW

Table 8.3-3 is replaced with a new Table (next page)

TABLE 8.3-3

INDENTIFICATION OF MAJOR LOADS - NO SAFETY INJECTION SIGNAL

Load	Rating (each)	EDG 1-3 U1 Bus F	EDG 1-2 U1 Bus G	EDG 1-1 U1 Bus H	EDG 2-3 U2 Bus F	EDG 2-1 U2 Bus G	EDG 2-2 U2 Bus H
480-V Load Center Transformer	1000 kVA	1F	1G	1H	2F	2G	2H
Centrifugal Charging Pump (CCP1 and CCP2)	600 hp	1-1	1-2	---	2-1	2-2	---
Auxiliary Saltwater Pump	400 hp	1-1	1-2	---	2-1	2-2	---
Motor Driven Auxiliary Feedwater Pump[(a)]	600 hp	1-3	---	1-2	2-3	---	2-2
Component Cooling Water Pump	400 hp	1-1	1-2	1-3	2-1	2-2	2-3
Containment Fan Cooler Unit[(b)]	100 hp	1-1 & 1-2	1-3 & 1-5	1-4	2-1 & 2-2	2-3 & 2-5	2-4

Diesel Generator Rating[1]:
Continuous = 2600 kW 2000 hours per one year period = 2750 kW 2 hours per 24 hour period= 2860 kW 30 minute = 3056 kW

[1] In accordance with the manufacturer's engine description and data sheet, the DGs are required to be derated if the inlet combustion air at the engine air intake filter is greater than 90°F and/or the jacket water temperature to the aftercooler inlet exceeds 160°F.

TABLE 8.3-5

DIESEL GENERATOR LOADING MAXIMUM STEADY STATE LOAD DEMAND FOLLOWING A LOSS-OF-COOLANT ACCIDENT

Load	Quantity Per Unit	Rating (each)	Maximum BHP	Maximum Demand, kW[e]					
				Bus 1F	Bus 2F	Bus 1G	Bus 2G	Bus 1H	Bus 2H
480-V load exclusive of containment fan coolers, fire pumps, momentary loads, and manually controlled loads[d]	3	1000 kVA		503	503	440	421	694	664
Load Center Transformer and Cable Losses				29	36	[illegible]	35	25	34
Centrifugal charging pumps (CCP1 and CCP2)	2	600 hp	650 hp	525	[illegible]	525	525	-	-
Safety injection pumps	2	400 hp	434 hp	[illegible]	344	-	-	344	344
Containment spray pumps	2	400 hp	440 hp	-	-	350	350	350	350
Residual heat removal pumps	2	400 hp	[illegible] hp	-	-	336	336	336	336
Containment fan coolers[b]	5	100 hp	103 hp	170	170	170	170	85	85
Component cooling water pumps	3	[illegible] hp	435 hp	342	342	342	342	342	342
Auxiliary saltwater pumps	[illegible]	400 hp	465 hp	373	373	373	373	-	-
Auxiliary feedwater pumps	2	600 hp	505 hp	394	394	-	-	394	394
Maximum demand on vital 4160-V buses upon a loss-of-coolant accident (c.2)			kW =	2680	2687	2563	2552	2570	2549
			kVAR =	1512	1515	1455	[illegible]	1352	1341
			kVA =	3077	3085	2947	293[illegible]	2904	2880

Diesel Generator Rating:
Continuous = 2600 kW 2000 Hour = 2750 kW 2 Hour = 3000 kW

Table 8.3-5 is replaced with a new Table (next page)

TABLE 8.3-5

DIESEL GENERATOR LOAD DEMAND FOLLOWING A LOSS-OF-COOLANT ACCIDENT

Load	Rating (each)	EDG 1-3 U1 Bus F	EDG 1-2 U1 Bus G	EDG 1-1 U1 Bus H	EDG 2-3 U2 Bus F	EDG 2-1 U2 Bus G	EDG 2-2 U2 Bus H
480-V Load Center Transformer	1000 kVA	1F	1G	1H	2F	2G	2H
Centrifugal Charging Pump (CCP1 and CCP2)	600 hp	1-1	1-2	---	2-1	2-2	---
Safety Injection Pump	400 hp	1-1	---	1-2	2-1	---	2-2
Residual Heat Removal Pump	400 hp	---	1-1	1-2	---	2-1	2-2
Auxiliary Saltwater Pump	400 hp	1-1	1-2	---	2-1	2-2	---
Motor Driven Auxiliary Feedwater Pump	600 hp	1-3	---	1-2	2-3	---	2-2
Containment Spray Pump	400 hp	---	1-1	1-2	---	2-1	2-2
Component Cooling Water Pump	400 hp	1-1	1-2	1-3	2-1	2-2	2-3
Containment Fan Cooler Unit[(b)]	100 hp	1-1 & 1-2	1-3 & 1-5	1-4	2-1 & 2-2	2-3 & 2-5	2-4

Diesel Generator Rating[1]:
Continuous = 2600 kW 2000 hours per one year period = 2750 kW 2 hours per 24 hour period= 2860 kW 30 minute = 3056 kW

[1] In accordance with the manufacturer's engine description and data sheet, the DGs are required to be derated if the inlet combustion air at the engine air intake filter is greater than 90°F and the jacket water temperature to the aftercooler inlet exceeds 160°F.

TABLE 8.3-6

VITAL 4160/480-VOLT LOAD CENTERS LOADING

List of Loads (Excluding Manually Operated Loads[j], Momentary Loads, Containment Fan Coolers, and Fire Pumps)	Quantity Per Unit	Rating (each)	Maximum Demand, kW[e]					
			Bus 1F	Bus 2F	Bus 1G	Bus 2G	Bus 1H	Bus 2H
Exhaust fans (auxiliary building including fuel handling area)	2	150 hp	130	130	-	-	130	130
Supply fans (vital dc and low-voltage ac equipment)	2	50 hp	40	40	-	-	40	40
Exhaust fans (vital dc and low-voltage ac equipment)	2	50 hp	40	40	-	-	40	40
Exhaust fans (auxiliary saltwater pump rooms)	2	1 hp	1	1	1	1	-	-
Fuel handling area exhausts (iodine removal)	2	75 hp	61	61	-	-	61	61
Supply fans (fuel handling area) - Fans S1 and S2	2	25 hp	-	-	21	21	21	21
Supply fans (auxiliary building) - Fans S31/33 and S32/34	2	60 hp	-	-	49	49	49	49
Supply fans (4 KV switchgear rooms)	3	1.5 hp	1.5	1.5	1.5	1.5	1.5	1.5
Main turbine-generator lube oil pump	1	60 hp	-	-	47	47	-	-

Table deleted

TABLE 8.3-6

List of Loads (Excluding Manually Operated Loads[j], Momentary Loads, Containment Fan Coolers, and Fire Pumps)	Quantity Per Unit	Rating (each)	Maximum Demand, kW[e] Bus 1F	Bus 2F	Bus 1G	Bus 2G	Bus 1H	Bus 2H
Auxiliary lube oil pumps for component cooling water pumps	3	0.5 hp	0.5	0.5	0.5	0.5	0.5	0.5
Feedwater pumps turning gears	2	1 hp	1	1		-	1	1
Makeup water transfer pumps	2[h]	30 hp	-	-	27	-	27	-
Primary water makeup pumps	2	15 hp	13	13	13	13	-	-
Boric acid transfer pumps	2	15 hp	12	12	12	12	-	-
Diesel fuel transfer pumps	2	5 hp	-	-	5	5	5	5
Charging pump (CCP1 and CCP2) auxiliary lube oil pumps	2	2 hp	2	2	2	2	-	-
Control room pressurization and ventilation[n]	2	72 kW	-	-	72	72	72	72
Unit 2 control room pressurization and ventilation(alternate source)[n]	2	72 kW	72	72	-	-	-	-
Containment hydrogen monitor	2	1.5 hp	-	-	2.5	3	2.5	3
Plant ventilation high radiation monitor	1	5 kVA	-	-	-	-	4	4

Table deleted

TABLE 8.3-6

List of Loads (Excluding Manually Operated Loads[j], Momentary Loads, Containment Fan Coolers, and Fire Pumps)	Quantity Per Unit	Rating (each)	Maximum Demand, kW[e] Bus 1F	Bus 2F	Bus 1G	Bus 2G	Bus 1H	Bus 2H
Containment air and gas radiation monitor pump	1	1.5 hp	-	-	1.5	1.5	-	-
Electric heat tracing boric acid system	-	-	10.2	10.1	3.4	9.4	13	18.9
RMS - 120 Vac distribution transformer	2	15 kVA	-	-	12	12	12	12
Electric heaters, boric acid tank	4	7.5 kW	-	-	7.5	8	7.5	8
Diesel generator auxiliary loads	-	-	42	42	42	42	42	42
Control rod position indication	1	-	8	8	-	-	-	-
Instrument ac system[a]	-	-	-	-	12	12	12	12
Battery chargers	6	82.5 kVA	46	46	46	46	46	46
Emergency ac lighting[g]	-	-	-	-	40	40	50	40
Communications	1	15 kVA	-	-	-	-	12	12
Inverter Rectifier	4		22.4	22	22.4	22	44.8	44
480-V load demand in kW, exclusive of the containment fan coolers and momentary loads		kW =	502.6	502.1	440.3	419.9	693.8	662.9

Table deleted

TABLE 8.3-7

VITAL 480-V LOAD CENTERS MAXIMUM DEMAND

Load	Quantity Per Unit	Rating (Each)	Maximum BHP	Maximum Demand, kW[e] Bus 1F	Bus 2F	Bus 1G	Bus 2G	Bus 1H	Bus 2H
480-V load, exclusive of containment fan coolers, momentary loads, manually operated loads[j], and fire pumps	3	1000 kVA		503	503	440	421	694	664
Containment fan coolers[b]	5	100 hp	170 hp	170	170	170	170	85	85
Maximum demand on the vital 480-V load centers			kW =	673	673	610	591	779	749
			kVAR =	540	540	509	500	484	470
			kVA =	863	863	794	774	917	884
Fire pumps (electric drive) None in Unit 2	2	200 hp	186 hp	147	---	---	---	147	---
Maximum load demand on the vital 480-V load centers concurrent with a fire			kW =	820	673	610	591	926	749
			kVAR =	612	540	509	500	556	470
			kVA =	1023	863	794	774	1080	884

Table deleted

DCPP UNITS 1 & 2 FSAR UPDATE

TABLE 8.3-12

MAXIMUM STEADY STATE DG LOADING AT 4340 V AND 60.8 HZ[(p)(q)]

Unit	DG	Bus	Description	Loading (kW)	Power Factor
1	1-3	F	Event 1, Case 4; LBLOCA, Bus H is De-Energized	2654	84.6%
	1-2	G	Event 1, Case 4; LBLOCA, Bus H is De-Energized	2648	85.4%
	1-1	H	Event 1, Case 3; LBLOCA, Bus G is De-Energized	2614	86.6%
2	2-3	F	Event 1, Case 4; LBLOCA, Bus H is De-Energized	2663	84.6%
	2-1	G	Event 1, Case 4; LBLOCA, Bus H is De-Energized	2641	85.1%
	2-2	H	Event 1, Case 3; LBLOCA, Bus G is De-Energized	2592	86.6%

New Table

New

Regulatory Commitments

Commitment 1:

Additional guidance will be provided in the surveillance procedures as part of implementation of the License Amendment to provide guidance to the operators on use of the new note added to SR 3.8.1.10 and to SR 3.8.1.14.

Enclosure
Attachment 6
PG&E Letter DCL-14-018

Comparison of Diesel Generator Testing Requirements in Regulatory Guide 1.108, Revision 1 to Regulatory Guide 1.9

(Information Only)

Comparison of Diesel Generator Testing Requirements in Regulatory Guide 1.108, Revision 1 to Regulatory Guide 1.9, Revision 3

RG 1.108, Revision 1 Regulatory Positions	RG 1.9, Revision 3 Regulatory Positions	TS SR #	TS SR current requirements	Proposed New SR Requirements	RG 1.108, R1 vs. RG 1.9, R3 Comparison
C.2.a Testing of diesel generator units during the plant preoperational test program and at least once every 18 months should:	2.2 Test Descriptions The following test descriptions are to be used in conjunction with the pre-operational and surveillance testing described in Table 1 of RG 1.9, R3.		N/A	N/A	Testing frequency comparisons are addressed below. NOTE: Per Amendments 200 and 201, the surveillance frequencies were relocated from the Technical Specification to a licensee-controlled document, the Surveillance Frequency Control Program.
C.2.a.(1) Demonstrate proper startup operation by simulating loss of all a.c. voltage and demonstrate that the diesel generator unit can start automatically and attain the required voltage and frequency within acceptable limits and time.	2.2.4 Loss-of-Offsite-Power (LOOP) Test: Demonstrate by simulating a loss-of-offsite power that (1) the emergency buses are deenergized and the loads are shed from the emergency buses, and (2) the emergency-diesel generator starts on the autostart signal from its standby conditions, attains the required voltage and frequency and energizes permanently connected loads within acceptable limits and time, energizes the autoconnected shutdown loads through the load sequencer, and operates for greater than or equal to 5 minutes.	SR 3.8.1.11	Current SR 3.8.1.11 requirement states: ————————NOTES———————— 1. All DG starts may be preceded by an engine prelube period. 2. This Surveillance shall not normally be performed in MODE 1, 2, 3, or 4. However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. ———————————————————— Verify on an actual or simulated loss of offsite power signal: 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 in ≤10 seconds, 2. energizes auto-connected loads through auto-transfer sequencing timers, 3. maintains steady state voltage ≥ 3785 V and ≤ 4400 V, 4. maintains steady state frequency ≥ 58.8 Hz and ≤ 61.2 Hz, and 5. supplies permanently connected and auto-connected loads for ≥ 5 minutes.	Proposed SR 3.8.1.11 requirement states: ————————NOTES———————— 1. All DG starts may be preceded by an engine prelube period. 2. This Surveillance shall not normally be performed in MODE 1, 2, 3, or 4. However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. ———————————————————— Verify on an actual or simulated loss of offsite power signal: 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 in ≤10 seconds, 2. energizes auto-connected loads through auto-transfer sequencing timers, 3. maintains steady state voltage ≥ **3980** V and ≤ **4340** V, 4. maintains steady state frequency ≥ **59.2** Hz and ≤ **60.8** Hz, and 5. supplies permanently connected and auto-connected loads for ≥ 5 minutes.	The DCCP Tech Spec testing is more consistent with RG 1.9, R3 requirements, which is more stringent than RG 1.108, R1 requirements. SR 3.8.1.11 deviates from RG 1.108, R1, RP C.2.a.(1) in that there is no verification that the diesel generator unit can attain the required voltage and frequency within acceptable limits and time; just that steady state voltage and frequency is achieved. This change was implemented as part of the conversion to the Improved Standard Technical Specifications (ISTS) per License Amendment 135. The proposed revisions to reduce the frequency and voltage ranges are consistent with RG 1.9, R3 and RG 1.108, R1. SR 3.8.11 is performed once every 24 months. RG 1.9, R3 stipulates every refueling outage. RG 1.108, R1 requires this test once every 18 months. The change from 18 to 24 months was approved per Amendment 135.
C.2.a.(2) Demonstrate proper operation for design accident loading-sequence to design-load requirements and verify that voltage and frequency are maintained within required limits.	2.2.5 SIAS Test: Demonstrate that, on a safety injection actuation signal (SIAS), the emergency diesel generator starts on the autostart signal from its standby conditions, attains the required voltage and frequency within acceptable limits and time, and operates on standby for greater than or equal to 5 minutes.	SR 3.8.1.12	Current SR 3.8.1.12 requirement states: ————————NOTES———————— 1. All DG starts may be preceded by an engine prelube period. 2. This Surveillance shall not normally be performed in MODE 1 or 2. However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. ———————————————————— Verify on an actual or simulated Safety Injection signal each DG auto-starts from standby condition and: a. In ≤ 10 seconds after auto-start and during tests, achieves voltage ≥ 3785 V and frequency ≥ 58.8 Hz; b. Achieves steady state voltage ≥ 3785 V and ≤ 4400 V, and frequency ≥ 58.8 Hz and ≤ 61.2 Hz; c. Operates for ≥ 5 minutes; d. Permanently connected loads are energized from the alternate offsite power source; and e. Emergency loads are auto-connected through the ESF load sequencing timers to the alternate offsite power source.	Proposed SR 3.8.1.12 requirement states: : ————————NOTES———————— 1. All DG starts may be preceded by an engine prelube period. 2. This Surveillance shall not normally be performed in MODE 1 or 2. However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. ———————————————————— Verify on an actual or simulated Safety Injection signal each DG auto-starts from standby condition and: a. In ≤ 10 seconds after auto-start and during tests, achieves voltage ≥ 3785 V and frequency ≥ 58.8 Hz; b. Achieves steady state voltage ≥ **3980** V and ≤ **4340** V, and frequency ≥ **59.2** Hz and ≤ **60.8** Hz; c. Operates for ≥ 5 minutes; d. Permanently connected loads are energized from the alternate offsite power source; and e. Emergency loads are auto-connected through the ESF load sequencing timers to the alternate offsite power source.	The DCCP Tech Spec testing complies with RG 1.108, R1 and is consistent with RG 1.9, R3. The proposed revisions to reduce the frequency and voltage ranges are consistent with RG 1.9, R3 and RG 1.108, R1. SR 3.8.1.12 is performed once every 24 months. RG 1.9, R3 stipulates every refueling outage. RG 1.108, R1 requires this test once every 18 months. The change from 18 to 24 months was approved per Amendment 135.

Comparison of Diesel Generator Testing Requirements in Regulatory Guide 1.108, Revision 1 to Regulatory Guide 1.9, Revision 3

RG 1.108, Revision 1 Regulatory Positions	RG 1.9, Revision 3 Regulatory Positions	TS SR #	TS SR current requirements	Proposed New SR Requirements	RG 1.108, R1 vs. RG 1.9, R3 Comparison
No requirement to perform combined SIAS and LOOP Tests.	2.2.6 Combined SIAS and LOOP Tests: Demonstrate that the emergency diesel generator can satisfactorily respond to a LOOP in conjunction with SIAS in whatever sequence they might occur (e.g., loss-of-coolant accident (LOCA) followed by delayed LOOP or LOOP followed by LOCA). A simultaneous LOOP/LOCA event would be demonstrated by simulating a LOOP and SIAS and verifying that (1) the emergency buses are deenergized and loads are shed from the emergency buses, and (2) the emergency diesel generator starts on the autostart signal from its standby conditions, attains the required voltage and frequency and energizes permanently connected loads within acceptable limits and time, energizes autoconnected loads through the load sequencer, and operates for greater than or equal to 5 minutes.	SR 3.8.1.19	Current SR 3.8.1.19 requirement states: ————————NOTES———————— 1. All DG starts may be preceded by an engine prelube period. 2. This Surveillance shall not normally be performed in MODE 1, 2, 3, or 4. However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. ———————————————————— Verify on an actual or simulated loss of offsite power signal in conjunction with an actual or simulated Safety Injection signal: a. De-energization of emergency buses; b. Load shedding from emergency buses; and c. DG auto-starts from standby condition and: 1. energizes permanently connected loads in ≤ 10 seconds, 2. energizes auto-connected emergency loads through load sequencing timers, 3. achieves steady state voltage ≥ 3785 V and ≤ 4400 V, 4. achieves steady state frequency ≥ 58.8 Hz and ≤ 61.2 Hz, and 5. supplies permanently connected and auto-connected emergency loads for ≥ 5 minutes.	SR 3.8.1.19 requirement states: ————————NOTES———————— 1. All DG starts may be preceded by an engine prelube period. 2. This Surveillance shall not normally be performed in MODE 1, 2, 3, or 4. However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. ———————————————————— Verify on an actual or simulated loss of offsite power signal in conjunction with an actual or simulated Safety Injection signal: a. De-energization of emergency buses; b. Load shedding from emergency buses; and c. DG auto-starts from standby condition and: 1. energizes permanently connected loads in ≤ 10 seconds, 2. energizes auto-connected emergency loads through load sequencing timers, 3. achieves steady state voltage ≥ **3980** V and ≤ **4340** V, 4. achieves steady state frequency ≥ **59.2** Hz and ≤ **60.8** Hz, and 5. supplies permanently connected and auto-connected emergency loads for ≥ 5 minutes.	The DCCP Tech Spec testing is consistent with RG 1.9, R3 for combined SIAS and LOOP Tests. RG 1.108, R1 does not require combined SIAS and LOOP Tests. The proposed revisions to reduce the frequency and voltage ranges are consistent with RG 1.9, R3 and RG 1.108, R1. SR 3.8.19 is performed once every 24 months. RG 1.9, R3 stipulates every refueling outage.
C.2.a.(3) Demonstrate full-load-carrying capability for an interval of not less than 24 hours, of which 22 hours should be at a load equivalent to the continuous rating of the diesel generator and 2 hours at a load equivalent to the 2-hour rating of the diesel generator. Verify that voltage and frequency requirements are maintained. The test should also verify that the cooling system functions within design limits.	2.2.9 Endurance and Margin Test: Demonstrate full-load carrying capability at a power factor between 0.8 and 0.9 for an interval of not less than 24 hours, of which 2 hours are at a load equal to 105 to 110 percent of the continuous rating of the emergency diesel generator, and 22 hours are at a load equal to 90 to 100 percent of its continuous rating. Verify that voltage and frequency requirements are maintained.	SR 3.8.1.14	Current SR 3.8.1.14 requirement states: ———————————————————— 1. Momentary transients outside the load and power factor ranges do not invalidate this test. ———————————————————— Verify each DG operating at a power factor ≤0.87 operates for ≥ 24 hours: a. For ≥ 2 hours loaded ≥ 2600 kW and ≤ 2860 kW; and b. For the remaining hours of the test loaded ≥ 2340 kW and ≤ 2600 kW.	Proposed SR 3.8.1.14 requirement states: ———————————————————— 1. Momentary transients outside the load and power factor ranges do not invalidate this test. **2. If performed with DG synchronized with offsite power, testing shall be performed at a power factor ≤ 0.84. However, if grid conditions do not permit, the power factor limit is not required to be met. Under this condition, the power factor shall be maintained as close to the limit as practicable.** ———————————————————— Verify each DG ~~operating at a power factor ≤0.87~~ operates for ≥ 24 hours: a. For ≥ 2 hours loaded at 2860 kW **(nominal)**; and b. For the remaining hours of the test loaded at **2750** kW **(nominal); and** **c. Verify DG cooling system functions within design limits.**	2 of 24 hr. endurance test: • RG 1.108, R1 at 2-hr. rating (2860 kW) • RG 1.9, R3 at 105 to 110 percent of the continuous rating (2730 kW - 2860 kW) • 105 percent of 2663 kW (max. accident load) = 2796 kW NOTE: 2-hr. endurance test will be 2860 kW less instrument uncertainty and less temperature derate (but not less than the maximum accident load). Proposed 2 of 24 hr. testing at a nominal value less than the 2-hr rating does not meet RG 1.108, R1. An exception to RG 1.108, Revision 1, Regulatory Position C.2.a.(3) is requested. RG 1.9, R3 is not applicable because the maximum predicted accident loads exceed the continuous rating.

Comparison of Diesel Generator Testing Requirements in Regulatory Guide 1.108, Revision 1 to Regulatory Guide 1.9, Revision 3

RG 1.108, Revision 1 Regulatory Positions	RG 1.9, Revision 3 Regulatory Positions	TS SR #	TS SR current requirements	Proposed New SR Requirements	RG 1.108, R1 vs. RG 1.9, R3 Comparison
					22 of 24 hr. endurance test: • RG 1.108, R1 at continuous rating (2600 kW) • RG 1.9, R3 at 90 to 100 percent of its continuous rating (2340 kW - 2600 kW) • 90 to 100 percent of 2663 kW (max. accident load) = 2397 - 2663 kW NOTE: 22-hr. endurance test will be 2750 kW less instrument uncertainty, a test band, and less temperature derate (but not less than the maximum predicted accident loads), which is greater than the continuous rating and greater than 90 percent of the max. accident load. Proposed 22 of 24 hr. testing meets RG 1.108, R1 and is consistent with RG 1.9, R3, RP 2.2.9 which requires the 22-hour portion of the test to be at a load equal to 90 to 100 percent of its continuous rating. The addition to "verify DG cooling system functions within design limits" is a RG 1.108, R1 requirement. The changes associated with power factor are consistent with RG 1.9, R3, RG 1.108, R1, RP C.2.a(3) does not have a power factor requirement. Both RG 1.108, R1 and RG 1.9, R3 require verification that voltage and frequency requirements are maintained. This change was implemented as part of the conversion to the Improved Standard Technical Specifications (ISTS) per License Amendment 135. SR 3.8.14 is performed once every 24 months. RG 1.9, R3 stipulates every refueling outage. RG 1.108, R1 requires this test once every 18 months. The change from 18 to 24 months was approved per Amendment 135.
C.2.a.(4) Demonstrate proper operation during diesel generator load shedding, including a test of the loss of the largest single load and of complete loss of load, and verify that the voltage requirements are met and that the overspeed limits are not exceeded.	2.2.7 Single-Load Rejection Test: Demonstrate the emergency diesel generator's capability to reject a loss of the largest single load while operating at power factor between 0.8 and 0.9 and verify that the voltage and frequency requirements are met and that the unit will not trip on overspeed.	SR 3.8.1.9	Current SR 3.8.1.9 requirement states: ——————NOTES—————— 1. This Surveillance shall not normally be performed in MODE 1 or 2. However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. 2. If performed with the DG synchronized with offsite power, it shall be performed at a power factor ≤ 0.9. ———————————————— 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 ≤ 63 Hz; b. Within 2.4 seconds following load rejection, the voltage is ≥ 3785 V and ≤ 4400 V; and c. Within 2.4 seconds following load rejection, the frequency is ≥ 58.8 Hz and ≤ 61.2 Hz.	Proposed SR 3.8.1.9 requirement states: ——————NOTES—————— 1. This Surveillance shall not normally be performed in MODE 1 or 2. However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. 2. If performed with the DG synchronized with offsite power, it shall be performed at a power factor ≤ 0.9. ———————————————— 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 ≤ 63 Hz; b. Within **1.6** seconds following load rejection, the voltage is ≥ 3785 V and ≤ 4400 V; and c. Within **1.6** seconds following load rejection, the frequency is ≥ 58.8 Hz and ≤ 61.2 Hz.	Current Tech Specs are based upon RG 1.9, R3, RP C.1.4: "Frequency should be restored to within 2 percent of nominal in less than 60 percent of each load-sequence interval for step load increase and in less than 80 percent of each load sequence interval for disconnection of the single largest load, and voltage should be restored to within 10 percent of nominal within 60 percent of each load-sequence time interval." Proposed Tech Spec is to comply with SG 9, RP C.4 (3/10/71), which states: " During recovery from transients caused by step load increases or resulting from the disconnection of the largest single load....Voltage should be restored to within 10 percent of nominal and frequency should be restored to within 2 percent of nominal in less than 40 percent of each load interval." SG 9 (3/10/71) is more conservative in regards to voltage and frequency recovery time than RG 1.9, R3. SR 3.8.1.9 is performed once every 24 months. RG 1.9, R3 stipulates every refueling outage. RG 1.108, R1 requires this test once every 18 months. The change from 18 to 24 months was approved per Amendment 135.
	2.2.8 Full-Load Rejection Test: Demonstrate the emergency diesel generator's capability to reject a load equal to 90 to 100 percent of its continuous rating while operating at power factor between 0.8 and 0.9, and verify that the voltage requirements are met and that the emergency diesel generator will not trip on overspeed.	SR 3.8.1.10	Current SR 3.8.1.10 requirement states: Verify each DG operating at a power factor ≤ 0.87 does not trip and voltage is maintained ≤ 5075 V during and following a load rejection of ≥ 2340 kW and ≤ 2600 kW.	Proposed SR 3.8.1.10 requirement states: ——————NOTE—————— **If performed with DG synchronized with offsite power, testing shall be performed at a power factor ≤ 0.84. However, if grid conditions do not permit, the power factor limit is not required to be met. Under this condition, the power factor shall be maintained as close to the limit as practicable.** ———————————————— Verify each DG ~~**operating at a power factor ≤ 0.87**~~ does not trip and voltage is maintained ≤ **5096** V during and following a load rejection of **2860** kW **(nominal).**	The DCCP Tech Spec testing complies with RG 1.108, R1 and is consistent with RG 1.9, R3 for full-load rejection tests. The changes associated with power factor are consistent with RG 1.9, R3, RG 1.108, R1, RP C.2.a.(4) does not have a power factor requirement. NOTE: Rejected load will be 2860 kW (2-hr. rating) less instrument uncertainty, a test band, and less temperature derate (but not less than 2684 kW), which is greater than 90 to 100 percent of the max. accident load. SR 3.8.1.10 is performed once every 24 months. RG 1.9, R3 stipulates every refueling outage. RG 1.108, R1 requires this test once every 18 months. The change from 18 to 24 months was approved per Amendment 135.

Comparison of Diesel Generator Testing Requirements in Regulatory Guide 1.108, Revision 1 to Regulatory Guide 1.9, Revision 3

RG 1.108, Revision 1 Regulatory Positions	RG 1.9, Revision 3 Regulatory Positions	TS SR #	TS SR current requirements	Proposed New SR Requirements	RG 1.108, R1 vs. RG 1.9, R3 Comparison
C.2.a.(5) Demonstrate functional capability at full-load temperature conditions by rerunning the test phase outlined in Regulatory Positions C.2.a.(1) and (2) above immediately following (3) above.	2.2.10 Hot Restart Test: Demonstrate hot restart functional capability at full-load temperature conditions (after it has operated for 2 hours at full load) by verifying that the emergency diesel generator starts on a manual or autostart signal, attains the required voltage and frequency within acceptable limits and time, and operates for longer than 5 minutes. This test may be performed following the endurance and margin test above.	SR 3.8.1.15	Current SR 3.8.1.15 requirement states: ————————NOTES———————— 1. This Surveillance shall be performed within 5 minutes of shutting down the DG after the DG has operated ≥ 2 hours loaded ≥ 2340 kW and ≤ 2600 kW. Momentary transients outside of load range do not invalidate this test. 2. All DG starts may be preceded by an engine prelube period. ———————————————— Verify each DG starts and achieves: a. In ≤ 10 seconds, voltage ≥ 3785 V and frequency ≥ 58.8 Hz; and b. Steady state voltage ≥ 3785 V and ≤ 4400 V, and frequency ≥ 58.8 Hz and ≤ 61.2 Hz.	Proposed SR 3.8.1.15 requirement states: ————————NOTES———————— 1. This Surveillance shall be performed within 5 minutes of shutting down the DG after the DG has operated ≥ 2 hours loaded **at 2750** kW **(nominal)**. Momentary transients outside of load range do not invalidate this test. 2. All DG starts may be preceded by an engine prelube period. ———————————————— Verify each DG starts and achieves: a. In ≤ 10 seconds, voltage ≥ 3785 V and frequency ≥ 58.8 Hz; and b. Steady state voltage ≥ **3980** V and ≤ **4340** V, and frequency ≥ **59.2** Hz and ≤ **60.8** Hz.	RG 1.108, R1 RP C.2.a (5) requires after the 24 hour run (RP C.2.a.(3)): • C.2.a.(1) Demonstrate proper startup operation by simulating loss of all a.c. voltage and demonstrate that the diesel generator unit can start automatically; AND • C.2.a.(2) Demonstrate proper operation for design accident loading-sequence to design-load requirements RG 1.9, R3 requires a Hot Restart following 2 hours at full load. The start can be manual or autostart AND and does not require the EDG to be loaded. An exception to the DG hot restart testing guidelines of RG 1.108, Revision 1, Regulatory Position C.2.a.(5) based on use of a modified hot restart test was approved by the NRC in License Amendment No. 105 to Facility Operating License No. DPR-80 and Amendment No. 104 to Facility Operating License No. DPR-82 for the DCPP, Unit Nos. 1 and 2, respectively, dated June 26, 1995. The proposed SR revision is to perform the test after ≥ 2 hours at the nominal 2000-hr. rating (i.e., 2750 kW nominal), which is greater than the full load (max. accident load). Therefore, the proposed test complies with RG 1.108, R1 as modified by the approved exception and is consistent with RG 1.9, R3. The proposed revisions to reduce the frequency and voltage ranges are consistent with RG 1.9, R3. RG 1.108, R1 has no voltage or frequency requirements. SR 3.8.1.15 is performed once every 24 months. RG 1.9, R3 stipulates every refueling outage. RG 1.108, R1 requires this test once every 18 months. The change from 18 to 24 months was approved per Amendment 135.
C.2.a.(6) Demonstrate the ability to (a) synchronize the diesel generator unit with offsite power while the unit is connected to the emergency load, (b) transfer this load to the offsite power, (c) isolate the diesel generator unit, and (d) restore it to standby status.	2.2.11 Synchronizing Test: Demonstrate the ability to (1) synchronize the emergency diesel generator unit with offsite power while the unit is connected to the emergency load, (2) transfer this load to the offsite power, and (3) restore the emergency diesel generator to ready-to-load status.	SR 3.8.1.16	Current SR 3.8.1.16 requirement states: ————————NOTE———————— This Surveillance shall not normally be performed in MODE 1, 2, 3, or 4. However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. ———————————————— Verify each DG: a. Synchronizes with offsite power source while loaded with emergency loads upon a simulated restoration of offsite power; b. Transfers loads to offsite power source; and c. Returns to ready-to-load operation.	No change proposed to SR 3.8.1.16	RG 1.108, R1 regulatory position C.2.a.(6) is essentially identical to RG 1.9, R3 regulatory position 2.2.11 except for: (d) restore it to standby status. SR 3.8.1.16 is performed once every 24 months. RG 1.9, R3 stipulates every refueling outage. RG 1.108, R1 requires this test once every 18 months. The change from 18 to 24 months was approved per Amendment 135.
C.2.a.(7) Demonstrate that the engine will perform properly if switching from one fuel oil supply system to another is a part of the normal operating, procedure to satisfy the 7-day storage requirement.	No requirement	SR 3.8.1.6	Current SR 3.8.1.6 requirement states: Verify the fuel oil transfer system operates to transfer fuel oil from storage tanks to the day tank.	No change proposed to SR 3.8.1.6	The DCCP Tech Spec testing complies with RG 1.108, Revision 1. RG 1.9, R3 does not require this test. SR 3.8.1.6 is performed once every 31 days. RG 1.108, R1 requires this test once every 18 months.
C.2.a.(8) Demonstrate that the capability of the diesel generator unit to supply emergency power within the required time is not impaired during periodic testing under Regulatory Position C.2.c.	2.2.13 Test Mode Change-Over Test: Demonstrate that with the emergency diesel generator operating in a test mode while connected to its bus, a simulated safety injection signal overrides the test mode by (1) returning the emergency diesel generator to standby operation and (2) automatically energizing the emergency loads from offsite power.	SR 3.8.1.17	Current SR 3.8.1.17 requirement states: ————————NOTE———————— This Surveillance shall not normally be performed in MODE 1, 2, 3, or 4. However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. ———————————————— Verify, with a DG operating in test mode and connected to its bus, an actual or simulated Safety Injection signal overrides the test mode by: a. Opening the auxiliary transformer breaker; and b. Automatically sequencing the emergency loads onto the DG.	No change proposed to SR 3.8.1.17	The DCCP Tech Spec testing complies with RG 1.108, R1 and is consistent with RG 1.9, R3. SR 3.8.1.17 is performed once every 24 months. RG 1.9, R3 stipulates every refueling outage. RG 1.108, R1 requires this test once every 18 months. The change from 18 to 24 months was approved per Amendment 135.
C.2.a.(9) Demonstrate the required reliability by means of any 69 consecutive valid tests* (per plant) with no failures, with a minimum of 23 or 69/n tests, whichever is the larger, per diesel generator unit (where n is equal to the number of diesel generator units of the same design and size). * Valid test as defined in RP C.2.e	2.3.1 Preoperaional Testing: In addition, through a minimum of 25 valid start-and-load demands in accordance with Regulatory Positions 2.2.2 and 2.2.3 without failure on each installed emergency diesel generator unit, demonstrate that an acceptable level of reliability has been achieved to place the new emergency diesel generator into an operational category.	N/A	No SR exists for this requirement. Diesel Generator failure rates are monitored per Procedure MA1.ID17, "Maintenance Rule Monitoring Program".	N/A	Exceptions to RG 1.108, Revision 1, Regulatory Positions C.2.a.(9), C.2.d, C.2.e, and C.3 were approved based on compliance with NUMARC 93-01, Revision 2, "Industry Guidelines for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," dated April 1996, as part of License Amendments No. 135 to Facility Operating Licenses No. DPR-80 and No. DPR-82 for the Diablo Canyon Power Plant, Unit Nos. 1 and 2, respectively, dated May 28, 1999.

Comparison of Diesel Generator Testing Requirements in Regulatory Guide 1.108, Revision 1 to Regulatory Guide 1.9, Revision 3

RG 1.108, Revision 1 Regulatory Positions	RG 1.9, Revision 3 Regulatory Positions	TS SR #	TS SR current requirements	Proposed New SR Requirements	RG 1.108, R1 vs. RG 1.9, R3 Comparison
C.2.b Testing of redundant diesel generator units during normal plant operation should be performed independently (nonconcurrently) to minimize common failure modes resulting from undetected interdependences among diesel generator units. However, during reliability demonstration of diesel generator units during plant preoperational testing and testing subsequent to any plant modification where diesel generator unit interdependence may have been affected or every 10 years (during a plant shutdown), whichever is the shorter, a test should be conducted in which redundant units are started simultaneously to help identify certain common failure modes undetected in single diesel generator unit tests.	2.2.14 Redundant Unit Test: Demonstrate that, by starting and running both redundant units simultaneously, potential common failure modes that may be undetected in single emergency diesel generator unit tests do not occur.	SR 3.8.1.20	Current SR 3.8.1.20 requirement states: ——————NOTE—————— All DG starts may be preceded by an engine prelube period. ———————————— Verify when started simultaneously from standby condition, each DG achieves: a. In ≤ 10 seconds, voltage ≥ 3785 V and frequency ≥ 58.8 Hz; and b. Steady state voltage ≥ 3785 V and ≤ 4400 V, and frequency ≥ 58.8 Hz and ≤ 61.2 Hz.	Proposed SR 3.8.1.20 requirement states: ——————NOTE—————— All DG starts may be preceded by an engine prelube period. ———————————— Verify when started simultaneously from standby condition, each DG achieves: a. In ≤ 10 seconds, voltage ≥ 3785 V and frequency ≥ 58.8 Hz; and b. Steady state voltage ≥ 3980 V and ≤ 4340 V, and frequency ≥ 59.2 Hz and ≤ 60.8 Hz.	The DCCP Tech Spec testing complies with RG 1.108, R1 and is consistent with RG 1.9, R3. The proposed revisions to reduce the frequency and voltage ranges are consistent with RG 1.9, R3 and RG 1.108, R1. SR 3.8.1.20 is performed once every 10 years per RG 1.9, R3 and RG 1.108, R1.
C.2.c Periodic testing of diesel generator units during normal plant operation should:					
C.2.c.(1) Demonstrate proper startup and verify that the required voltage and frequency are automatically attained within acceptable limits and time. This test should also verify that the components of the diesel generator unit required for automatic startup are operable.	2.2.1 Start Test: Demonstrate proper startup from standby conditions, and verify that the required design voltage and frequency is attained. For these tests, the emergency diesel generator can be slow started and reach rated speed on a prescribed schedule that is selected to minimize stress and wear.	SR 3.8.1.2	Current SR 3.8.1.2 requirement states: ——————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. ———————————— Verify each DG starts from standby conditions and achieves steady state voltage ≥ 3785 V and ≤ 4400 V, and frequency ≥ 58.8 Hz and ≤ 61.2 Hz.	Proposed SR 3.8.1.2 requirement states: ——————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. ———————————— Verify each DG starts from standby conditions and achieves steady state voltage ≥ 3980 V and ≤ 4340 V, and frequency ≥ 59.2 Hz and ≤ 60.8 Hz.	The DCCP Tech Spec testing complies with RG 1.108, R1 and is consistent with RG 1.9, R3. The SR was split into two separate SRs during the conversion to the ISTS (Amendment 135). The proposed revisions to reduce the frequency and voltage ranges are consistent with RG 1.9, R3 and RG 1.108, R1. RG 1.108, R1 C.2.c.(1) requires this test once every 31 days and should depend on demonstrated performance. SR 3.8.1.2 is performed once every 31 days per RG 1.9, R3 (monthly). SR 3.8.1.7 is performed once every 184 days. Per RG 1.9, R3, this is test should be performed every 6 months (but may be substituted for a monthly test) and every refueling outage.
	2.2.3 Fast-Start Test: Demonstrate that each emergency diesel generator unit starts from standby conditions. If a plant normally has in operation prewarm systems designed to maintain lube oil and jacket water cooling at certain temperatures or prelubrication systems or both, this would constitute normal standby conditions for that plant. Verify that the emergency diesel generator reaches required voltage and frequency within acceptable limits and time as defined in the plant technical specifications.	SR 3.8.1.7	Current SR 3.8.1.7 requirement states: ——————NOTE—————— All DG starts may be preceded by an engine prelube period. ———————————— Verify each DG starts from standby condition and achieves: a. In ≤ 10 seconds, voltage ≥ 3785 V and frequency ≥ 58.8 Hz; and b. Steady state voltage ≥ 3785 V and ≤ 4400 V, and frequency ≥ 58.8 Hz and ≤ 61.2 Hz.	Proposed SR 3.8.1.7 requirement states: ——————NOTE—————— All DG starts may be preceded by an engine prelube period. ———————————— Verify each DG starts from standby condition and achieves: a. In ≤ 10 seconds, voltage ≥ 3785 V and frequency ≥ 58.8 Hz; and b. Steady state voltage ≥ 3980 V and ≤ 4340 V, and frequency ≥ 59.2 Hz and ≤ 60.8 Hz.	
C.2.c.(2) Demonstrate full-load-carrying capability (continuous rating) for an interval of not less than one hour. The test should also verify that the cooling system functions within design limits. This test could be accomplished by synchronizing the generator with the offsite power and assuming a load at the maximum practical rate.	2.2.2 Load-Run Test: Demonstrate 90 to 100 percent of the continuous rating of the emergency diesel generator, for an interval of not less than 1 hour and until temperature equilibrium has been attained. This test may be accomplished by synchronizing the generator with offsite power. The loading and unloading of an emergency diesel generator during this test should be gradual and based on a prescribed schedule that is selected to minimize stress and wear on the diesel generator.	SR 3.8.1.3	Current SR 3.8.1.3 requirement states: ——————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 ≥ 2340 kW and ≤ 2600 kW.	Proposed SR 3.8.1.3 requirement states: ——————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 of 2860 kW (nominal) and DG cooling system functions within design limits.	The continuous rating for the DGs is 2600 kW. The maximum accident load is 2663 kW. The proposed test load exceeds the continuous rating and the maximum accident load, which demonstrates the full-load carrying capability. The proposed Tech Spec complies with RG 1.108 Rev. 1, which is to demonstrate full-load-carrying capability, and is consistent with RG 1.9, R3. NOTE: Test load will be 2860 kW (2-hr. rating) less instrument uncertainty, a test band, and any engine derating required due to ambient conditions at the time of the test (but not less than 2684 kW), which is greater than 90 to 100 percent of the max. accident load. The addition to "verify DG cooling system functions within design limits" is a RG 1.108, R1 requirement. SR 3.8.1.3 is performed once every 31 days. Per RG 1.9, R3, this test should be performed monthly but may be substituted for a 6 month test. RG 1.108, R1 requires this test once every 31 days and should depend on demonstrated performance.

Comparison of Diesel Generator Testing Requirements in Regulatory Guide 1.108, Revision 1 to Regulatory Guide 1.9, Revision 3

RG 1.108, Revision 1 Regulatory Positions	RG 1.9, Revision 3 Regulatory Positions	TS SR #	TS SR current requirements	Proposed New SR Requirements	RG 1.108, R1 vs. RG 1.9, R3 Comparison
No requirement to perform a Protective Trip Bypass Test.	2.2.12 Protective Trip Bypass Test: Demonstrate that all automatic emergency diesel generator trips (except engine overspeed, generator differential, and those retained with coincident logic) are automatically bypassed upon an SIAS. This test may be performed in conjunction with Regulatory Positions 2.2.5 and 2.2.6.	SR 3.8.1.13	Current SR 3.8.1.13 requirement states: Verify each DG's automatic trips are bypassed when the diesel engine trip cutout switch is in the cutout position and the DG is aligned for automatic operation except: a. Engine overspeed; b. Generator differential current; and c. Low lube oil pressure;	No change proposed to SR 3.8.1.13	RG 1.108, Revision 1 does not require this test, which is performed as a result of previous License Amendments based upon RG 1.9, R3. SR 3.8.1.13 is performed once every 24 months. RG 1.9, R3 stipulates every refueling outage.
C.2.d After completion of the diesel generator unit reliability demonstration under Regulatory Position C.2.a.(9), the interval for periodic testing under Regulatory Position C.2.c (on a per diesel generator unit basis) should be no more than 31 days and should depend on demonstrated performance. If more than one failure has occurred in the last 100 tests (on a per nuclear unit basis), the test interval should be shortened in accordance with the following schedule:	No requirement	N/A	No SR exists for this requirement. Testing interval is per the maintenance program that implements the 10 CFR 50.65 Maintenance Rule to continue to ensure DG performance (Amendment 135 page 26). Diesel Generator failure rates are monitored per Procedure MA1.ID17, "Maintenance Rule Monitoring Program".	N/A	Exceptions to RG 1.108, Revision 1, Regulatory Positions C.2.a.(9), C.2.d, C.2.e, and C.3 were approved based on compliance with NUMARC 93-01, Revision 2, "Industry Guidelines for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," dated April 1996, as part of License Amendments No. 135 to Facility Operating Licenses No. DPR-80 and No. DPR-82 for the Diablo Canyon Power Plant, Unit Nos. 1 and 2, respectively, dated May 28, 1999. Per Amendments 200 and 201, the surveillance frequencies were relocated from the Technical Specification to a licensee-controlled document, the Surveillance Frequency Control Program.
C.2.d.(1) If the number of failures in the last 100 valid tests is one or zero, the test interval should be not more than 31 days.					
C.2.d.(2) If the number of failures in the last 100 valid tests is two, the test interval should be not more than 14 days.					
C.2.d.(3) If the number of failures in the last 100 valid tests is three, the test interval should be not' more than 7 days.					
C.2.d.(4) If the number of failures in the last 100 valid tests is four or more, the test interval should be not more than 3 days.					
C.2.e Valid tests and failures (under Regulatory Positions C.2.a.(9) and C.2.d) should be based on the following criteria:	See Section "2.1 Definitions"	N/A	No SR exists for this requirement. The evaluation of valid DG tests is performed by STP M-9I. This test determines whether a D/G start and run is a success, failure or neither a success or failure as defined in NRC Regulatory Guide 1.108 and NUMARC 87 00, "Guidelines and Technical Bases for NUMARC Initiatives Addressing Station Blackout at Light Water Reactors," Revision 1, August 1991	N/A	Exceptions to RG 1.108, Revision 1, Regulatory Positions C.2.a.(9), C.2.d, C.2.e, and C.3 were approved based on compliance with NUMARC 93-01, Revision 2, "Industry Guidelines for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," dated April 1996, as part of License Amendments No. 135 to Facility Operating Licenses No. DPR-80 and No. DPR-82 for the Diablo Canyon Power Plant, Unit Nos. 1 and 2, respectively, dated May 28, 1999.
C.2.e.(1) All 'start attempts (automatic, including those from bona fide signals, or manual) that result in a failure to start, except as noted in (2) below, should be considered valid tests and failures.					
C.2.e.(2) Unsuccessful start and load attempts that can definitely be attributed to operating error, spurious operation of a trip that is bypassed in the emergency operating mode, to malfunction of equipment that is not operative in the emergency operating mode (e.g., synchronizing circuitry) or is not part of the defined diesel generator unit design should not be considered valid tests or failures.					
C.2.e.(3) Successful starts, including those initiated by bona fide signals, followed by successful loading (sequential or manual) to at least 50% of continuous rating and continued operation for at least one hour should be considered valid successful tests.					
C.2.e.(4) Successful starts that are terminated intentionally without loading, as defined in. (3) above, should not be considered valid tests or failures.					
C.2.e.(5) Successful starts followed by an unsuccessful loading attempt should be considered valid tests and failures, except as noted in (2) above.					
C.2.e.(6) Tests that are terminated intentionally before completion as defined in (3) above because of an alarmed abnormal condition that would ultimately have resulted in diesel generator damage or failure should be considered valid tests and failures.					
C.2.e.(7) Tests performed in the process of troubleshooting should not be considered valid tests. Tests that are performed to verify correction of the problem should be considered valid tests and successes or failures, as appropriate.	See Section "2.1 Definitions"	N/A	No SR exists for this requirement. The evaluation of valid DG tests is performed by STP M-9I. This test determines whether a D/G start and run is a success, failure or neither a success or failure as defined in NRC Regulatory Guide 1.108 and NUMARC 87 00, "Guidelines and Technical Bases for NUMARC Initiatives Addressing Station Blackout at Light Water Reactors," Revision 1, August 1991	N/A	Exceptions to RG 1.108, Revision 1, Regulatory Positions C.2.a.(9), C.2.d, C.2.e, and C.3 were approved based on compliance with NUMARC 93-01, Revision 2, "Industry Guidelines for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," dated April 1996, as part of License Amendments No. 135 to Facility Operating Licenses No. DPR-80 and No. DPR-82 for the Diablo Canyon Power Plant, Unit Nos. 1 and 2, respectively, dated May 28, 1999.
C.2.e.(8) Cranking and venting procedures that lead to the discovery of conditions (e.g., excessive water or oil in a cylinder) that would have resulted in the failure of the diesel generator unit during test or during response to a bona fide signal should be considered a valid test and failure.					

Enclosure
Attachment 7
PG&E Letter DCL-14-018

List of Previous License Amendments affecting Technical Specifications 3/4.8.1

(Information Only)

List of Previous License Amendments affecting Technical Specifications 3/4.8.1

LA .No	Date	Units	Submittal(s)	Description	Effected TSs	References
LA 0	8/26/1985	1 & 2	N/A	Issued Combined Unit 1 & 2 License which incorporated LA 1 and LA 2		
LA 9/7	6/20/1986	1 & 2	DCL 85-375 (12/26/85)	LAR 85-15: Received approval for a one time outage on DG 1-3 of 10 days for overhaul during the Unit 1 refueling outage.	3.8.1.1	
LA 15/14	7/24/1987	1 & 2	DCL 85-373 (12/24/85) DCL 87-021 (2/3/87)	LAR 85-12: Change required to reduce excessive test of DGs.	LCO 3.8.1.1.a, LCO 3.8.1.1.b (new), LCO 3.8.1.1.c, LCO 3.8.1.1.d, LCO 3.8.1.1.e, LCO 3.8.1.1.f, LCO 3.8.1.1.g, and LCO 3.8.1.1.h. SR 4.8.1.1.2 footnote, SR 4.8.1.1.2.b, SR 4.8.1.1.4, and Table 4.8.1	GL 84-15
LA 44/43	10/4/1989	1 & 2	DCL 89-126 (5/11/89) DCL 89-129 (5/12/89) DCL 89-176 (7/3/89) DCL 89-191 (7/18/89) DCL 89-230 (9/5/89)	LAR 89-05: Revised Diesel Generator Allowed Outage Time from 72 hour to 7 days.	LCO 3.8.1.1, SR 4.8.1.1.2	
LA 74/73	8/12/1992	1 & 2	DCL 92-036 (2/14/92) DCL 92-131 (6/5/92)	LAR 92-03: Revises the require amount of Diesel Fuel Oil stored in Modes 1 through 6. IT provides for taking a storage tank out of service for cleaning and inspection once every 10-years.	LCO 3.8.1.1, LCO 3.8.1.2	
LA 76/75	3/2/1993	1 & 2	DCL 92-234 (10/30/92)	LAR 92-07: Provides a one-time extension of the 7-day Diesel Generator Allowed Outage Time for Diesel Generator 1-3 to 14-days. This revise is provided to allow installation of new Diesel Generator 2-3.	LCO 3.8.1.1, Action b	
LA 86/85	1/6/94 2/4/94	1 & 2	DCL 92-281 (12/22/92) DCL 93-178 (7/19/93)	LAR 92-08: This change revises the second level undervoltage protection setpoint and allowable value. It also revises the testing requirements for the Diesel Generators.	Table 3.3-4, Functional Unit 7.b, TS 3/4.8.1, Surveillance Requirements	
LA 93/92	8/23/94 9/15/94	1 & 2	DCL 93-278 (12/8/93)	LAR 93-07: This amendment revises the required quantity of diesel fuel oil stored in the Day Tanks. IT also revises area air temperature monitoring to delete reference to 5 diesels.	Table 3.7-5, LCO 3.8.1.1, SR 4.8.1.1.1, SR 4.8.1.1.2,LCO 3.8.1.2	
LA 95/94	9/23/1994	1 & 2	DCL 94-190 (8/29/94)	LAR 94-10: This change provides an alternate method of determining water and sediment content of diesel fuel oil. Change requested on an exigent basis.	SR 4.8.1.1.3.c.1)d	ASTM D1796-83, ASTM D4176-82, ASTM D975-81
LA 103/102	6/2/95 12/21/95	1 & 2	DCL 94-294 (12/30/94)	LAR 94-12: Clarifies some TS revised by the Eagle 21 Reactor Protection System modification with bypass manifold elimination issued by LA 84/83. It eliminates reference to RM-14A and RM-14B.	TS 2.2, 3/4.3.1, 3/4.3.2, 3/4.3.3, 3/4.4.4, 3/4.4.9, 3/4.5.2, 3/4.8.1, 3/4.9.2, 3/4.9.9, 3/4.10.3	LA 84/83 - Cleanup
LA 105/104	6/26/95 7/6/95	1 & 2	DCL 95-086 (4/19/95)	LAR 95-03: The requirement to perform a loss-of-offsite-power load sequence test within 5 minutes of completing the 24 hour load run is replaced by a hot restart with no required loading following a 2-hour loaded run.	4.8.1.1.2	NUREG-1366 RG 1.108, R1
LA 109/108	1/3/1996	1 & 2	DCL 95-219 (9/29/95)	LAR 95-05: Provides approval of a one time outage for the DFO storage system of 120 total to allow replacement of the storage tanks based upon alternate storage.	3/4.8.1.1, 3/4.8.1.2	

List of Previous License Amendments affecting Technical Specifications 3/4.8.1

LA 111	3/8/1996	1	DCL 96-025 (1/18/96)	Allowed replacement of the Unit1 Auxiliary Transformer 1-1 by providing an one time extending of the AOT from 72 hours to 120 hours.	3/4.8.1.1, Action Statement e	
LA 126/124	6/5/98 11/19/98	1 & 2	DCL 97-021 (2/14/97) DCL 98-028 (4/15/98) DCL 98-049 (3/31/98)	LAR 97-01: Revises refueling cycle to 24-months (LAR #4)	Table 4.3-2, SRs 4.4.3.2, 4.4.4.1, 4.8.1.1.1, 4.8.1.1.2	
LA 127/125	6/5/1998	1 & 2	DCL-97-028 (2/27/97) DCL 97-196 (12/4/97)	LAR 97-02: Revised the term "ambient" conditions for testing of the DGs to state "Standby" conditions.	3/4.8.1.1	
LA 135/135	5/28/1999	1 & 2	DCL 97-106 (6/2/97) DCL 98-003 (1/9/98) DCL 98-087 (6/25/98) DCL 98-107 (8/5/98) DCL 98-116 (8/28/98) DCL 98-134 (9/25/98) DCL 98-144 (10/16/98) DCL 98-154 (10/23/98) DCL 98-168 (11/25/98) DCL 98-167 (12/4/98) DCL 98-180 (12/17/98) DCL 98-185 (12/30/98) DCL 99-028 (2/24/99) DCL 99-034 (3/10/99) DCL 99-063 (4/28/99) DCL 99-070 (5/11/99) DCL 99-072 (5/19/99) DCL 99-078 (5/27/99)	LAR 97-09: Takes the Technical Specifications written using NUREG-0452, Rev. 4 and revises them in accordance with NUREG-1431, Rev. 1, Westinghouse Standard Technical Specifications	All LCOs were reformatted and revised. The Bases is completely re-written	Various
LA 166/167	4/20/2004	1&2	DCL-03-060 DCL-03-142 DCL-03-179	LAR 03-06 requests NRC approval to revise TS 3.8.1, "AC Sources - Operating," to extend the completion time for an inoperable diesel generator from 7 days to 14 days.	3.8.1 LCO 3.8.1 Action	
LA 174/176	9/28/2004	1&2	DCL-03-061 DCL-03-178 DCL-04-055	LAR 03-07 – The amendments revise several surveillance requirements (SRs) in TS 3.8.1 on alternating current sources for plant operation. The revised SRs have notes deleted or modified to adopt in part the NRC staff approved TSTF-283, Revision 3, which will allow these revised SRs to be performed, or partially performed, in reactor modes that previously were not allowed by the TSs.	3.8.1	
LA 200/201	10/30/2008	1&2	DCL-07-097 DCL-08-057	LAR 07-04 – The amendments relocate surveillance frequencies of most surveillance tests from the TSs to a licensee-controlled document, the Surveillance Frequency Control Program. Once relocated, changes to the surveillance frequencies may be made using a risk-informed methodology, Nuclear Energy Institute (NEI) document NEI 04-10 Rev. 1, as specified in the Administrative Controls of the TS. The NRC staff has previously approved NEI 04-10 Rev. 1, as acceptable for referencing in licensing applications.	All SRs were revised.	NEI 04-10, R1
LA 211/213	3/29/2012	1&2	DCL-11-038	LAR 11-03 – The proposed changes would revise the TS 3.8.1 Surveillance Requirements (SRs) per TSTF Traveler TSTF-163, Revision 2, to verify minimum frequency and voltage, and steady state frequency and voltage within limits following diesel generator (DG) start. The proposed changes would also revise the Final Safety Analysis Report (FSAR) Update to identify an exception to Regulatory Guide (RG) 1.9, Revision 0.	SR 3.8.1.2 SR 3.8.1.7.a SR 3.8.1.7.b SR 3.8.1.12.a SR 3.8.1.12.b SR 3.8.1.15.a SR 3.8.1.15.b SR 3.8.1.20.a SR 3.8.1.20.b	