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PG&E Letter DCL-15-022

U.S. Nuclear Regulatory Commission
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Docket No. 50-275, OL-DPR-80
Docket No. 50-323, OL-DPR-82
Diablo Canyon Units 1 and 2
Response to NRC Request for Additional Information Regarding License Amendment Request 14-01, "Revision to Technical Specification 3.8.1, 'AC Sources – Operating'"

References: 1. PG&E Letter DCL-14-018, License Amendment Request 14-01, "Revision to Technical Specifications 3.8.1, 'AC Sources – Operating,'" dated March 27, 2014 (ADAMS Accession No. ML14086A426)

2. NRC Letter, "Diablo Canyon Power Station, Units 1 and 2 – Requests for Additional Information (RAIs) for License Amendment Request 14-01 Associated with Revision to TS 3.8.1, 'AC Sources – Operating' (TAC Nos. MF3826 and MF3827)," dated January 29, 2015

Dear Commissioners and Staff:

PG&E Letter DCL-14-018, dated March 27, 2014, submitted License Amendment Request (LAR) 14-01, "Revision to Technical Specification 3.8.1, 'AC Sources – Operating.'" LAR 14-01 proposed 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;
(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 3.8.1.1 0 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.

On January 29, 2015, the NRC staff requested additional information required to complete the review of LAR 14-01 (Reference 2). PG&E's responses to the staff's questions are provided in the Enclosure.

This information does not affect the results of the technical evaluation or the no significant hazards consideration determination previously transmitted in PG&E Letter DCL-14-018.

PG&E makes no regulatory commitments (as defined by NEI 99-04) in this letter. This letter includes no revisions to existing regulatory commitments.

If you have any questions, or require additional information, please contact Philippe Soenen at (805) 545-6984.

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

Executed on February 19, 2015.

Sincerely,

James M. Welsch
Site Vice President

e1d7/4418/50307101
Enclosure
cc: Diablo Distribution
cc/enc: Marc L. Dapas, NRC Region IV Administrator
Thomas R. Hipschman, NRC Senior Resident Inspector
Siva P. Lingam, NRR Project Manager
Gonzalo L. Perez, Branch Chief, California Dept of Public Health

PG&E Response to NRC Request for Additional Information Regarding License Amendment Request 14-01, "Revision to Technical Specification 3.8.1, 'AC Sources – Operating'"

NRC RAI EPNB-1

Section 3.4 of the license amendment request states that, for each day tank, "The minimum volume is obtained by considering: DG operation at full load for 60 minutes plus margin..." ANSI N195-1976 states that the day tank capacity shall be based on the fuel consumption at a load of 100% of the continuous rating of the diesel plus a minimum margin of 10%. Please confirm that the margin that you used is at least 10%.

PG&E Response:

The proposed Diablo Canyon Power Plant (DCPP) diesel generator (DG) day tank usable minimum volume is conservatively based on the fuel consumption at a load of 2750 kilowatt (kW) plus 10 percent margin. The continuous rating of the DCPP DGs is 2600 kW.

NRC RAI EEEB-1:

In PG&E's submittal dated March 27, 2014, the licensee provided a summary of assumptions and results of the DG load study analysis. This DG load study analysis was performed to address the NRC resident inspector observations related to the implementation of NRC Temporary Instruction 2515/176, "Emergency Diesel Generator Technical Specification Surveillance Requirements Regarding Endurance and Margin Testing," to evaluate Class 1E 4160 V Engineered Safety Features bus loading under various Design Basis Accident scenarios. The DG load study analysis appears to only consider kilowatt (kW) losses. Since the kilovolt (kV) ampere reactive (kVAR) losses will increase the current that the switchgear has to manage, please describe how the kVAR losses were considered when analyzing the DG loading.

PG&E Response:

The DG loading analysis considers both equipment kVAR loading demand and system losses. The kVAR demand of motors is adjusted in conjunction with the kW demand resulting from operation at 60.8 hertz (Hz) to achieve the appropriate motor power factor. Both kW and kVAR losses associated with the electrical distribution system (e.g. 4.16 kV / 480 volt (V) transformer and cables) are computed and included as a "load constituent" in determining the maximum steady state DG loading.

In addition to DG loading, the kVAR demand on equipment within the electrical distribution system is also considered when evaluating the ampacity rating of the equipment.

NRC RAI EEEB-2:

The LAR proposes a new voltage range of ≥ 3980 V and ≤ 4340 V for SRs 3.8.1.2, 3.8.1.7, 3.8.1.9, 3.8.1.11, 3.8.1.12, 3.8.1.19, and 3.8.1.20. The current requirements of induction motors and other voltage sensitive equipment vary according to available voltage and frequency. Please provide excerpts from calculations with a summary that validate DG loading when operating at extremes of the proposed voltage range.

PG&E Response:

A sensitivity analysis study was performed with the DG frequency at 60.8 Hz. This study analyzes the DG peak output load in conjunction with the DG maximum and minimum output voltage. The total peak steady-state load on the DG consists of three components: constant power (kVA) loads (e.g. motors, inverters, and battery chargers), 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 of voltage variation; constant impedance loads vary as the square of the ratio of operating voltage to rated voltage; cable and transformer losses associated with constant kVA components increase when voltage is decreased; and cable and transformer losses associated with constant impedance loads decrease when voltage is decreased. As shown in the table below, the sensitivity analysis study results indicate 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 peaks loads were determined at the maximum operating voltage of 4340 V.

Variations in DG Peak Steady-State Loads

DG	Bus	DG @ Max Voltage		DG @ Min Voltage	
		Output Voltage (V)	Peak Continuous Load (kW)	Output Voltage (V)	Peak Continuous Load (kW)
13	F	4340	2652	3980	2645

NOTE: This sensitivity analysis study was performed as an alternative analysis to the DG load analysis calculation to demonstrate that DG operation at maximum voltage provides a bounding condition for maximum DG loading. The resultant peak load at maximum voltage from the study differs from the resultant loads of the final DG load analysis calculation due to the different computational tools and input parameters utilized by each analysis. For example, the DG load analysis calculation conservatively considers a high voltage condition to maximize load demand and maximized system losses from a low voltage condition.