



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

July 7, 2010

Mr. John T. Conway
Senior Vice President – Energy Supply
and Chief Nuclear Officer
Pacific Gas and Electric Company
Diablo Canyon Power Plant
77 Beale Street, Mail Code B32
San Francisco, CA 94105

SUBJECT: RESPONSE TO THE PACIFIC GAS AND ELECTRIC COMPANY REQUEST
FOR DIABLO CANYON POWER PLANT TECHNICAL SPECIFICATION
INTERPRETATION OF 230 KILOVOLT SYSTEM OPERABILITY (TAC NOS.
ME3346 and ME3347)

Dear Mr. Conway:

By letter dated February 23, 2009, and supplemented by letter dated September 14, 2009, Pacific Gas and Electric Company (PG&E, the licensee) in accordance with U.S. Nuclear Regulatory Commission (NRC) Inspection Manual, Part 9900: Technical Guidance, Chapter STSINTR, "Licensee Technical Specification Interpretations," requested NRC concurrence with its position regarding the capacity and capability of the Diablo Canyon Power Plant, Unit Nos. 1 and 2 (DCPP), 230 kiloVolt (kV) offsite power system to meet Technical Specification (TS) 3.8.1, "AC [Alternating Current] Sources -Operating," and TS 3.8.2, "AC Sources - Shutdown." The NRC provided its evaluation of the PG&E request for interpretation in a letter dated December 14, 2009. By letter dated February 9, 2010, PG&E requested clarifications to the NRC staff's evaluation.

Enclosed is the NRC staff's evaluation providing the requested clarifications to the staff's position on the TS interpretation of the DCPP 230 kV offsite power system operability. If you have any questions, please contact me at (301) 415-1445 or alan.wang@nrc.gov.

Sincerely,

A handwritten signature in cursive script that reads "Alan Wang".

Alan Wang, Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-275 and 50-323

Enclosure:
As stated

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EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
CLARIFICATION OF NRC STAFF POSITION ON TECHNICAL SPECIFICATION
INTERPRETATION OF 230 KILOVOLT SYSTEM OPERABILITY
PACIFIC GAS AND ELECTRIC COMPANY
DIABLO CANYON POWER PLANT, UNITS 1 AND 2
DOCKET NOS. 50-275 AND 50-323

1.0 INTRODUCTION

By letter dated February 23, 2009 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML090650592), and supplemented by letter dated September 14, 2009 (ADAMS Accession No. ML092650289), Pacific Gas and Electric Company (PG&E, the licensee) in accordance with U.S. Nuclear Regulatory Commission (NRC) Inspection Manual, Part 9900: Technical Guidance, Chapter STSINTR, "Licensee Technical Specification Interpretations," requested NRC concurrence with its position regarding the capacity and capability of the Diablo Canyon Power Plant, Unit Nos.1 and 2 (DCPP), 230 kiloVolt (kV) offsite power system to meet Technical Specification (TS) 3.8.1, "AC [Alternating Current] Sources - Operating," and TS 3.8.2, "AC Sources -Shutdown." The NRC provided its evaluation of the PG&E request for interpretation in a letter dated December 14, 2009 (ADAMS Accession No. ML093130428). By letter dated February 9, 2010 (ADAMS Accession No. ML100490751), PG&E requested clarifications to the NRC staff's evaluation.

In its evaluation dated December 14, 2009, the NRC staff stated that the DCPP TS Limiting Condition for Operation (LCO) 3.8.1.a and TS LCO 3.8.2.a do not include the operability requirement that the 230 kV electrical transmission system load flow and dynamic loading analyses demonstrating that the 230 kV system has sufficient capacity and capability to operate the engineered safety features (ESFs) for a design-basis accident (or unit trip) on one unit, and those systems required for an orderly shutdown of the second unit. While the capacity and capability of the 230 kV transmission system are important electrical system parameters and may affect TS operability, they are not specifically identified as TS LCO 3.8.1.a or TS LCO 3.8.2.a operability requirements and, therefore, should not be used to determine compliance with DCPP TS LCO 3.8.1 or TS LCO 3.8.2. The NRC staff did not agree that TS LCOs 3.8.1.a and 3.8.2.a operability is based on the ability to transfer to the 230 kV offsite power system without loading the emergency diesel generators, and provide adequate voltage to safety-related loads. Therefore, the NRC staff concluded that the DCPP design and licensing

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basis requires that the 230 kV system offsite power source must have sufficient capacity and capability to (1) operate the ESFs for a design-basis accident on one unit and concurrent safe shutdown on the remaining unit and (2) operate the ESFs for dual unit trips as a result of a seismic event or abnormal operational occurrences.

In its letter dated February 9, 2010, PG&E requested additional clarifications to the NRC staff's evaluation regarding the TS interpretation of the DCPD 230 kV offsite power system operability.

2.0 REGULATORY EVALUATION

The following NRC requirements and guidance documents were applicable to the staff's review of the licensee's TS interpretation request:

- General Design Criterion (GDC) 17, "Electric power systems," of Appendix A, "General Design Criteria for Nuclear Power Plants," to Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, requires, in part, that nuclear power plants have onsite and offsite electric power systems to "permit [the] functioning of structures, systems, and components [that are] important to safety." The onsite system is required to have "sufficient independence, redundancy, and testability" to perform its safety function, assuming a single failure. The offsite power system is required to be supplied by "two physically independent circuits ... designed and located so as to minimize to the extent practical the likelihood of their simultaneous failure under operating and postulated accident and environmental conditions." In addition, this criterion requires provisions to "minimize the probability of losing electric power from any of the remaining [electric power] supplies as a result of ... the loss of power [from the unit], the loss of power from the [offsite] transmission network, or the loss of power from the onsite electric power supplies."
- NRC Regulatory Guide (RG) 1.32, Revision 0, "Criteria for Safety-Related Electric Power Systems for Nuclear Power Plants," describes a method acceptable to the NRC staff of complying with GDC 17, "Inspection and testing of electric power systems," with respect to the design, operation, and testing of safety-related electric power systems in all types of nuclear power plants.
- The DCPD TSs 3.8.1 and 3.8.2 require the operability of the offsite power system as a part of the LCO and specify actions to be taken when the offsite power system is inoperable.

3.0 TECHNICAL EVALUATION

The licensee requested the following clarifications in its letter dated February 9, 2010, to the staff's evaluation dated December 14, 2009, regarding the TS interpretation of the DCPD 230 kV offsite power system operability:

Clarification No.1

The NRC evaluation conclusion states, "While the capacity and capability of the 230 kV transmission system are important electrical system parameters and may affect TS operability, they are not specifically identified as TS LCO 3.8.1.a or TS LCO 3.8.2.a operability requirements and, therefore, should not be used to determine compliance with DCPD TS LCO 3.8.1 or TS LCO 3.8.2." The evaluation also confirms that the DCPD TS 3.8.1 and 3.8.2 Bases description of the offsite circuit is consistent with STS [Standard Technical Specification] 3.8.1 and 3.8.2 Bases which state, in part, that "[a]n offsite circuit consists of all breakers, transformers, switches, interrupting devices, cabling, and controls required to transmit power from the offsite transmission network to the onsite Class 1E SF bus(es)." From these statements, it is not clear if this response precludes considering one unit's 230kV system operable if, when supplying that unit's class 1E buses and the other unit's 1E buses, load flow and dynamic loading analyses demonstrate sufficient capacity to supply both units from that unit's startup transformer under the most challenging design conditions. Clarification is requested.

Response

As stated in the NRC staff's evaluation dated December 14, 2009, the DCPD TS requirement for two qualified offsite power sources (or circuits) refers to the circuits from the transmission network via the 230 kV/12 kV and 500 kV/25 kV transformers to the Class 1E ESF buses for each unit. Specifically, one TS "offsite circuit" is the 230 kV power supply which includes the first inter-tie breaker(s) at the 230 kV switchyard, the 230 kV/12 kV transformers, and all of the equipment downstream such as breakers, transformers, switches, interrupting devices, cabling, and controls up to the Class 1E buses. Similarly, the other TS "offsite circuit" is supplied from the 500 kV switchyard to the onsite Class 1E ESF buses. In summary, the 230kV system operability is determined by its own offsite circuits and its associated components for each unit and cannot be substituted with the other unit's startup transformer or buses.

Clarification No. 2

The NRC evaluation states, "Compliance with DCPD TS LCO 3.8.1 also requires the offsite power sources meet GDC 17. This GDC requires the offsite power system 'provide sufficient capacity and capability to assure that (1) specified acceptable fuel design limits and design conditions of the reactor coolant pressure boundary are not exceeded as a result of anticipated operational occurrences and (2) the core is cooled and containment integrity and other vital functions are maintained in the event of postulated accidents.' Also, GDC 5 ["Sharing of structures, systems, and components"] requires that licensees shall

not share structures, systems, and components important to safety among nuclear power units, 'unless it can be shown that such sharing will not significantly impair their ability to perform their safety functions....'" The response goes on to describe that the system must have sufficient capacity and capability to (1) operate the engineered safety features (ESF) for a design-basis accident on one unit and concurrent safe shutdown on the remaining unit, and (2) operate the ESFs for dual unit trips as a result of a seismic event or abnormal operational occurrences. The term "concurrent safe shutdown" is not explicitly defined in the response. The response separately states on page 4 of the evaluation without reference to other documents that, "The licensee must ensure that a spurious ESF actuation on the non-accident unit would not result in the loss of the preferred power supply." With this information, is the correct definition of "concurrent safe shutdown" the worst case of an accident on one unit concurrent with a spurious ESF on the other unit, or a dual unit trip?

Response

As stated in the NRC staff's evaluation dated December 14, 2009, the DCCP design and licensing basis require the offsite power system to have sufficient capacity and capability to operate the ESF equipment for (1) a design-basis accident on one unit and concurrent safe shutdown on the remaining unit as described in the Institute of Electrical and Electronics Engineers (IEEE) Standard 308-1971, "Class IE Electrical Systems," Section 8, "Multi-Unit Station Considerations"; (2) dual unit trips as a result of a seismic event as prescribed by Item 22, "Seismic Trip," of TS Table 3.3.1-1, "Reactor Trip System Instrumentation," or abnormal operational occurrences in accordance with GDC 17; and (3) an accident in one unit and a spurious ESF actuation on the non-accident unit in accordance with design criteria provided in NUREG-75/087, "Standard Review Plan for Review of Safety Analysis Reports for Nuclear Power Plants," Section 8.2, Part III.9 (April 1978). It is incumbent upon the licensee to perform sufficient analysis, considering the above scenerios, to determine the most limiting case.

Clarification No. 3

The NRC evaluation states, "offsite power operability is dependent on the availability of system voltages above the degraded voltage setpoints, as described in TS 3.3.5, "Loss of Power Diesel Generator Start Instrumentation." Meeting these minimum voltage requirements ensures that preferred offsite power sources are available to support safe shutdown of DCCP under postulated conditions." The correct relay setpoint to use would appear to be that for the second level undervoltage protection relay as described in the bases of TS 3.3.5. For the purposes of operability, is it the voltage setpoint alone, or would it include the time delay element of the setpoint?

Response

The operability and availability of the offsite power system depends on the capability of the offsite power circuits to support plant shutdown following the worst-case design and licensing basis loading conditions. The voltage and time delay elements of the degraded voltage setpoints provide protection of the safety-related equipment from degraded grid conditions.

4.0 CONCLUSION

Based on the above discussion regarding the licensee's TS 3.8.1 and TS 3.8.2 operability, the NRC staff has provided the requested clarifications. These clarifications are consistent with the staff's position provided to the licensee in a letter dated December 14, 2009.

Principal Contributors: R. Mathew
G. Waig

Date: July 7, 2010

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Sincerely,
/RA/

Alan Wang, Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-275 and 50-323

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