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PG&E Letter DCL-09-010

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555

Docket No. 50-275, OL-DPR-80  
Docket No. 50-323, OL-DPR-82  
Diablo Canyon Units 1 and 2  
Request for Technical Specification Interpretation Regarding 230 kV System  
Operability

Dear Commissioners and Staff:

In accordance with NRC Inspection Manual, Part 9900: Technical Guidance, Chapter STSINTR, "Licensee Technical Specification Interpretations," Pacific Gas and Electric Company (PG&E) requests NRC concurrence with the following position regarding 230 kV offsite power system operability to meet Technical Specification (TS) 3.8.1, "AC Sources – Operating," and TS 3.8.2, "AC Sources - Shutdown."

*The 230 kV offsite power system is considered operable for normal and off-normal configurations when load flow and dynamic loading analyses demonstrate that the 230 kV system has sufficient capacity and capability to operate the engineered safety features for a design basis accident (or unit trip) on one unit, and those systems required for an orderly shutdown of the second unit. A concurrent trip of the second unit need not be assumed. 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.*

PG&E considers this position on 230 kV offsite power system operability to be consistent with the Diablo Canyon Power Plant licensing basis and the safety evaluation related to License Amendments 132 and 130, for Units 1 and 2, respectively, issued April 29, 1999. Those amendments approved modifications to the 230 kV offsite power system that included the installation of startup transformers having an automatic load tap changer, and the installation of shunt capacitor banks. The basis for the position is provided in the enclosure.

Your response is requested by September 1, 2009. If you have any questions, or require additional information, please contact Stan Ketelsen at (805) 545-4720.

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Sincerely,

James R. Becker  
*Site Vice President*

tcg/DA50085862

Enclosure

cc: Elmo E. Collins, NRC Region IV  
Alan B. Wang, NRC Project Manager  
Diablo Distribution

cc/enc: Michael S. Peck, NRC Senior Resident Inspector

**Request for Technical Specification Interpretation  
Regarding 230 kV Offsite Power System Operability**

PG&E Position Regarding 230 kV Offsite Power System Operability

The 230 kV offsite power system is considered operable for normal and off-normal configurations when load flow and dynamic loading analyses demonstrate that the 230 kV system has sufficient capacity and capability to operate the engineered safety features for a design basis accident (or unit trip) on one unit, and those systems required for an orderly shutdown<sup>1</sup> of the second unit. A concurrent trip of the second unit need not be assumed. 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.

Basis for PG&E Position

By letter dated January 14, 1998 (Reference 1), as supplemented by letters dated May 19, 1998 (Reference 2), and three letters dated February 5, 1999 (References 3, 4, and 5), Pacific Gas and Electric Company (PG&E) submitted a License Amendment Request for the review and approval of modifications to the Diablo Canyon Power Plant (DCPP) Units 1 and 2, 230 kV offsite power system that included the installation of startup transformers having an automatic load tap changer, and the installation of shunt capacitor banks.

In a letter dated March 16, 1998 (Reference 6), the NRC staff identified additional technical information required in order to complete an evaluation of the modifications to the DCPP Units 1 and 2 230 kV offsite power system. That request in part asked PG&E to confirm the following:

*The Diablo Canyon licensing basis requires the offsite system to have sufficient capacity and capability to supply the necessary voltage to safety system loads following the occurrence of two transmission network contingencies. Confirm this.*

*The first transmission network contingency is defined as the loss of the worst case (most heavily loaded) transmission line, switchyard bus, capacitor bank, or generating unit connected to (or associated with) the transmission network, assuming the worst case summer and/or winter expected loading or operating configuration of the transmission network. Five exceptions to this contingency*

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<sup>1</sup> An orderly shutdown includes time to permit the operator to coordinate the reduction in electrical generation with the load dispatcher to ensure the stability and availability of the electrical grid. The shutdown would proceed in a controlled and orderly manner that is well within the specified maximum cooldown rate and within the capabilities of the unit to reduce thermal stresses on components of the reactor coolant system and the potential for a plant upset that could challenge safety systems. This is consistent with a Technical Specification (TS) required shutdown.

are explicitly defined on page 8.2-3 of Section 8.2.2 of Revision 11 of the FSAR [Final Safety Analysis Report].

*The second contingency is defined as the trip of one of the two Diablo Canyon units following a loss of coolant accident and trip of the second unit 30 seconds following trip of the accident unit or, if more limiting, assuming one unit operating at 100 percent power with a loss of coolant accident trip.*

PG&E's response to this request for additional information on May 19, 1998 (Reference 2), clarified the second contingency stating that a trip of the other unit is not postulated.

The May 19, 1998, letter also provided the results of load flow and transient stability studies for bus transfer to the 230 kV source following a loss of coolant accident (trip). These studies were performed to confirm operability for normal and anticipated off-normal configurations of the transmission network to ensure the 230 kV offsite power system with the proposed modifications had sufficient capacity and capability to operate the engineered safety features for a design basis accident (or unit trip) on one unit, and those systems required for an orderly shutdown of the second unit.

PG&E's May 19, 1998, response was revised in a letter dated February 5, 1999 (Reference 3), to make clear that, "a trip of a second unit 30 seconds after a design basis accident or trip of the first unit is not part of the licensing basis." The revised response in part states:

*The licensing basis for the DCPD offsite power system requires the offsite power system to have sufficient capacity and capability to operate the engineered safety features for a DBA (or unit trip) on one unit, and those systems required for an orderly shutdown of the second unit. A trip of the second unit 30 seconds following the DBA, is not a licensing or design basis requirement.*

*To ensure that this requirement is met, load flow and dynamic loading analyses are performed for anticipated operating configurations of the transmission system (e.g., a generating unit out of service, transmission line(s) out of service, or voltage control devices out of service), assuming the worst case summer and/or winter expected loading conditions. Analyses are also done to examine the affect of one 230/12 kV standby startup transformer (SUT) being unavailable, and for manual 230/12 kV standby SUT load tap changer (LTC) operation. Operability is based on the ability to transfer to the 230-kV system following a DBA or unit trip without loading the emergency diesel generators, and provide adequate voltage to the safety-related loads. Compensatory measures, including blocking the transfer of nonessential loads, may be necessary for certain transmission system configurations to ensure adequate voltage to the vital buses.*

The normal configuration of the 230 kV offsite circuits is defined in the TS 3.8.1 Bases as follows:

*The Unit 1 Offsite Circuit #1 consists of [230 kV/12 kV] Startup Transformer 1-1 supplied from the immediate access 230 kV Switchyard power source, which feeds [12 kV/4 kV] Startup Transformer 1-2 through series supply breakers 52VU12 and 52VU14. Startup Transformer 1-2 then supplies power through breaker 52HG15 to each vital bus feeder breaker (Bus F - 52HF14, Bus G - 52HG14, Bus H - 52HH14).*

*The Unit 2 Offsite Circuit #1 consists of [230 kV/12 kV] Startup Transformer 2-1 supplied from the immediate access 230 kV Switchyard power source, which feeds [12 kV/4 kV] Startup Transformer 2-2 through series supply breakers 52VU23 and 52VU24. Startup Transformer 2-2 then supplies power through breaker 52HG15 to each vital bus feeder breaker (Bus F - 52HF14, Bus G - 52HG14, Bus H - 52HH14).*

For the normal configuration, all 230 kV transmission lines that could have an impact on the operability of offsite power, including voltage support devices such as the automatic load tap changer and capacitor banks at DCPD and Mesa, are assumed to be in service.

For 230 kV offsite power system configurations other than the normal configuration (i.e., off-normal configurations) operation is limited by plant operating procedure OP J-2:VIII, "Guidelines for Reliable Transmission Service for DCPD." The limitations in OP J-2:VIII are based on analyses that demonstrate that the 230 kV system has sufficient capacity and capability to operate the engineered safety features for a design basis accident (or unit trip) on one unit, and those systems required for an orderly shutdown and cooldown of the second unit.

The off-normal configurations evaluated included alignment of both units to a single startup transformer supplied from the immediate access 230 kV switchyard power source. Operation in this configuration is consistent with 1967 General Design Criterion (GDC) 4 that states reactor facilities shall not share any systems or components unless it is shown safety is not impacted by the sharing (FSAR Update 3.1.2.4). Operation in this configuration also conforms to the intent of 1971 GDC 5 that prohibits structures, systems, and components important to safety from being shared among nuclear power units unless it is shown that such sharing will not significantly impair their ability to perform their safety functions; including, in the event of an accident in one unit, an orderly shutdown and cooldown of the remaining units.

The NRC authorized the licensing basis changes requested by PG&E in License Amendments (LA) 132 and 130, for DCPD Units 1 and 2, respectively, dated April 29, 1999 (ADAMS Accession No. ML022390464).

The following excerpt from the NRC staff safety evaluation provides the basis for approval of LAs 132 and 130:

Normal offsite system configurations:

*For the normal offsite system configuration (defined above), analysis results indicate that the 230 kV system will continue to remain operable in accordance with licensing basis requirements described above following offsite system contingencies or events. These analysis results satisfy staff review procedures/guidelines described in Section 8.2, Part II 1.1.(f), of the NRC's Standard Review Plan (NUREG-0800) for meeting the requirements of Criterion 17 of 10 CFR Part 50, Appendix A. The results provide reasonable assurance that offsite power will be operable and thus available to safety system loads when needed following an accident. The failure of equipment (such as the capacitor banks and automatic load tap changers which have been added to the system as either new or replacement equipment) have been included as single contingencies/events in the analysis. The NRC staff thus concludes that the proposed new offsite system configuration, which utilizes the availability of power from the Gates and Midway substations and automatic load tap changers and capacitors to maintain/support voltage, has sufficient reliability to be available when needed, and is considered acceptable.*

Off-normal system configurations

*For the off-normal configurations (defined above) and for various combinations of these configurations, analysis results also indicated operability or inoperability with actions (if available) that are needed to reestablish operability for each configuration. Operability was clarified/defined with respect to the DCPD technical specifications. Operability is assumed when analysis demonstrates the availability of the 230 kV system following a design basis accident.*

*Criterion 17 of 10 CFR Part 50, Appendix A, requires the availability of offsite power to safety system loads following a design basis accident. The licensee's clarification/definition for operability meets this requirement. Thus, when the offsite system will be operated with an off-normal configuration, the system's reliability (the availability of the 230 kV system with sufficient capacity and capability when needed following a design basis event) will not be significantly affected. Individual system components have excellent reliability as demonstrated by their operating history. The majority of components perform their design function on a continuous basis and thus their operability (or availability) is also continuously monitored. Loss of availability, monitored by offsite system operators, is immediately reported by procedure to DCPD operators. The newly installed load tap changers and capacitor banks have been conservatively designed and are likewise considered to have excellent reliability. Operability of the load tap changer is monitored from the DCPD control room.*

*Operability of capacitor banks is monitored remotely by offsite system operators and inoperability is immediately reported by procedure to DCCP operators.*

As discussed in the safety evaluation, the NRC staff reviewed the licensing basis changes requested by PG&E from two standpoints:

- Grid stability – As delineated in the first paragraph, the staff reviewed the proposed new offsite system configuration and the results of the supporting load flow and dynamic loading analyses in accordance with the procedures/guidelines of Standard Review Plan (NUREG 0800), Section 8.2, III.1.(f). The staff concluded that the system would be of sufficient reliability to be available to supply safety system loads when needed following an accident.
- Vital Bus Operability – As delineated in the second and third paragraphs, the staff reviewed the proposed system and supporting analysis results relative to operability of the 230 kV system as clarified/defined with respect to the DCCP technical specifications. The basis for operability was defined/clarified in our February 5, 1999, letter as "the ability to transfer to the 230-kV system following a DBA or unit trip without loading the emergency diesel generators, and provide adequate voltage to the safety-related loads." The staff concluded that the analysis results confirmed operability, or inoperability with actions (if available) that are needed to reestablish operability, for the various configurations evaluated.

The FSAR Update, TS Bases, and plant procedures were revised to reflect the NRC staff approval as described in the safety evaluation.

### Summary

The 230 kV offsite power system is considered operable for normal and off-normal configurations when load flow and dynamic loading analyses demonstrate that the 230 kV offsite power system has sufficient capacity and capability to operate the engineered safety features for a design basis accident (or unit trip) on one unit, and those systems required for an orderly shutdown of the second unit. A concurrent trip of the second unit need not be assumed. 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. The basis for continued operation while in anticipated off-normal configurations was reviewed and approved in Amendments 132 and 130, for Units 1 and 2, respectively.

This position is consistent with the DCCP licensing basis and the safety evaluation related to the issuance of Amendments 132 and 130.

### References

1. PG&E Letter DCL-98-008, "License Amendment Request 98-01,

- Implementation of 230kV Improvements," dated January 14, 1998 (ADAMS Accession No. ML9801220198)
2. PG&E Letter DCL-98-076, "Response to NRC Request for Additional Information Regarding License Amendment Request (LAR) 98-01," dated May 19, 1998 (ADAMS Accession No. ML9805280285)
  3. PG&E Letter DCL-99-013, "Additional Information Regarding License Amendment Request (LAR) 98-01, Implementation of 230 kV System Improvements," dated February 5, 1999 (ADAMS Accession No. ML9902160209)
  4. PG&E Letter DCL-99-014, "Revision of FSAR Update - Electrical Power," dated February 5, 1999 (ADAMS Accession No. ML9902160180)
  5. PG&E Letter DCL-99-018, "Additional Information Regarding License Amendment Request (LAR) 98-01 - Implementation of 230 kV System Improvements," dated February 5, 1999 (ADAMS Accession No. ML9902160215)
  6. NRC letter to PG&E dated March 16, 1998, "Request for Additional Information - Proposed License Amendment Regarding Offsite Electrical Power System Improvements (TAC Nos. MA0743 AND MA0744)" (ADAMS Accession No. ML9803200129)
  7. NRC letter to PG&E dated April 29, 1999, "Issuance of Amendments for Diablo Canyon Nuclear Power Plant, Unit No. 1 (TAC No. MA0743) and Unit 2 (TAC No. MA0744)" (ADAMS Accession No. ML022390464)