January 13, 2000

Mr. Gregory M. Rueger
Senior Vice President and General Manager
Pacific Gas and Electric Company
Diablo Canyon Nuclear Power Plant
P. O. Box 3
Avila Beach, CA 93424

SUBJECT: ISSUANCE OF AMENDMENTS FOR DIABLO CANYON NUCLEAR POWER PLANT, UNIT NOS. 1 AND 2 (TAC NOS. MA1406 AND MA1407)

Dear Mr. Rueger:

The Commission has issued the enclosed Amendment No. 138 to Facility Operating License No. DPR-80 and Amendment No. 138 to Facility Operating License No. DPR-82 for the Diablo Canyon Nuclear Power Plant (DCNPP), Unit Nos. 1 and 2, respectively. The amendments authorize changes to the Final Safety Analysis Report (FSAR) Update in response to your application dated March 18, 1998, as supplemented by letters dated March 25, September 29, and November 3, 1999.

These amendments authorize revisions to the licensing basis as described in the FSAR Update to incorporate the mitigation of passive and active failures in the auxiliary saltwater and component cooling water systems during long-term core cooling following a loss-of-coolant accident.

A copy of the related Safety Evaluation is enclosed. The Notice of Issuance will be included in the Commission's next regular biweekly Federal Register notice.

Sincerely,

RA

Steven D. Bloom, Project Manager, Section 2
Project Directorate IV & Decommissioning
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-275
and 50-323

Enclosures:
1. Amendment No. 138 to DPR-80
2. Amendment No. 138 to DPR-82
3. Safety Evaluation

cc w/encls: See next page

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PACIFIC GAS AND ELECTRIC COMPANY

DOCKET NO. 50-275

DIABLO CANYON NUCLEAR POWER PLANT, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 138
License No. DPR-80

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Pacific Gas and Electric Company (the licensee) dated March 18, 1998, as supplemented by letters dated March 25, September 29, and November 3, 1999, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, by Amendment No. 138, the license is amended to authorize revision of the Final Safety Analysis Report (FSAR) Update as set forth in the application for amendment by Pacific Gas and Electric Company dated March 18, 1998, as supplemented by letters dated March 25, September 29, and November 3, 1999. Pacific Gas and Electric Company shall update the FSAR Update to reflect the revised licensing basis authorized by this amendment in accordance with 10 CFR 50.71(e).

Date of Issuance: January 13, 2000 3.

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PACIFIC GAS AND ELECTRIC COMPA

DOCKET NO. 50-323

DIABLO CANYON NUCLEAR P

AMENDMENT TO FACILITY OPER

Amendment No. 138
License No. DPR-82

1. The Nuclear Regulato

A. The application for amendm
dated March 18, 1998, as s
and November 3, 1999, co
Atomic Energy Act of 1954
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B. The facility will operate in c
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C. There is reasonable assura
can be conducted without e
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D. The issuance of this amend
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E. The issuance of this amend
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2. Accordingly, by Amen
Final Safety Analysis R
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3. Date of Issuance: January 13, 2000

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 138 TO FACILITY OPERATING LICENSE NO. DPR-80

AND AMENDMENT NO. 138 TO FACILITY OPERATING LICENSE NO. DPR-82

PACIFIC GAS AND ELECTRIC COMPANY

DIABLO CANYON NUCLEAR POWER PLANT, UNITS 1 AND 2

DOCKET NOS. 50-275 AND 50-323

1.0 INTRODUCTION

By letter dated March 18, 1998, as supplemented by letters dated March 25, September 29, and November 3, 1999, Pacific Gas and Electric Company (PG&E) submitted a License Amendment Request (LAR) for the review and approval of changes in the mitigation of passive and active failures in the auxiliary saltwater (ASW) and component cooling water (CCW) systems during long-term core cooling following a loss-of-coolant accident (LOCA).

During normal operation, PG&E operates Diablo Canyon Power Plant (DCPP) with the CCW loops and the ASW[1] loops crosstied. In this configuration, PG&E states that it meets the single active failure criterion reference of 10 CFR 50.46(d) to 10 CFR Part 50 Appendix A, Design Criterion 35 for the short term following initiation of a LOCA. For long-term operation, PG&E previously separated the loops to obtain two separate CCW/ASW trains at approximately 10½ hours after the LOCA, within the 24 hours that PG&E claims elapses before long-term operation. In Licensee Event Report (LER) 1-97-001-00, "The Component Cooling Water System Has Operated With Procedural Guidance That Permitted Operation in a Condition Outside the Design Basis of the Plant," dated March 3, 1997, PG&E reported that, while successful in meeting the passive failure requirement, splitting the loops to achieve two separate trains made the plant vulnerable to a more limiting single active failure, if an active failure had not yet occurred. Consequently, PG&E has applied to amend its license to include a technical support center (TSC) decision to separate the loops after an evaluation of plant conditions. There are four potential configurations:

(1) ASW loops crosstied and CCW loops crosstied
(2) ASW loops separated and CCW loops separated
(3) ASW loops crosstied and CCW loops separated
(4) ASW loops separated and CCW loops crosstied

Configuration (1) is the normal operation and short-term post-LOCA configuration. Configuration (3) is the configuration normally achieved by following the licensee's procedures

[1]The Diablo Canyon equivalent of the service water system.

unless there are failures which put operation outside of the design basis. As discussed below, the staff finds Configurations (1) and (3) acceptable. Configurations (2) and (4) require operator action within 3 to 5 minutes to mitigate a single failure for conditions where at least 10 minutes, and perhaps more, is normally acceptable.[2]

The supplemental letters dated March 25, September 29, and November 3, 1999, provided additional clarifying information, did not expand the scope of the application as originally noticed, and did not change the staff's original proposed no significant hazards consideration determination published in the Federal Register on October 7, 1998 (63 FR 53953).

2.0 EVALUATION

The Diablo Canyon CCW system consists of three CCW pumps, two CCW heat exchangers, two vital cooling loops (A and B), and a non-vital cooling loop (C) which has been seismically analyzed to maintain its pressure boundary following a safe shutdown earthquake (see Diablo Canyon Supplemental Safety Evaluation Report No. 16 [SSER 16]). During post-accident conditions, CCW Loops A and B provide cooling to containment fan coolers, residual heat removal (RHR) heat exchangers, coolers for centrifugal charging pumps, safety injection pumps, CCW pumps, RHR pumps, and post-accident sampling system coolers. In its letter dated March 18, 1998, PG&E reported that CCW Loop C would be isolated following initiation of a LOCA, and CCW Loops A and B would normally remain crosstied during short-term operation following initiation of a LOCA.

Heat from the CCW system is rejected to the ultimate heat sink via the ASW system. The ASW system consists of two ASW pumps which supply the two CCW heat exchangers. During normal operation and during the initial post-LOCA response, when the two ASW supply headers are crosstied, a single ASW pump can provide flow to both CCW heat exchangers. Each unit is provided with three emergency diesel generators (EDGs) to power the engineered safety feature (ESF) components in the event of a loss-of-offsite power (LOOP). Each of the EDGs supplies one of three vital electrical buses (F, G, and H). Prior to this LAR, protection from a passive failure on the ASW and CCW systems was ensured by splitting these systems into two separate cooling trains. With the trains separated, a single active failure causing a loss of Vital Bus F would result in the loss of CCW flow in one train and the loss of ASW cooling flow to the other CCW train. This results in a total loss of heat removal from the containment. Similarly, a single active failure causing a loss of Vital Bus G following completion of the train separation would result in the loss of ASW flow to one CCW train. As a result, the RHR heat exchanger on that train would not be cooled. The RHR pump on the other train is also unavailable because it is also powered by Vital Bus G, resulting in a loss of RHR system function. Therefore, the systems are vulnerable to passive failure when crosstied and to active failure when the trains are split.

The LAR addresses the mitigation of passive and active failures in the ASW and CCW systems during long-term core cooling following LOCA . Prior to the described change, both the ASW and CCW systems were maintained in the pre-event configuration with the ASW and CCW

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[2]Shorter times may be acceptable following staff evaluation. The licensee did not pursue further evaluation.

loops in a cross-tied configuration until approximately 10½ hours after the LOCA. In this configuration, the systems would meet the 10 CFR Part 50 single failure criterion for active failures, but would not meet the long-term criterion for passive failure unless operator mitigation actions were credited. Consequently, at approximately 10½ hours, per emergency operating procedure E-1.4, "Transfer to Hot Leg Recirculation," the CCW and ASW loops were to be separated into two independent CCW/ASW trains, a configuration that would meet the passive single failure criterion during the long-term recovery phase beginning 24 hours after the accident. However, the separated configuration would be vulnerable to the more limiting single active failure, such as an electrical failure and operator intervention would be necessary to address an active failure, should one occur. The ASW system did not have the design ability to withstand a single active failure with the trains separated. In the described change, the separation decision would be made by the TSC in accordance with established procedures after evaluation of plant conditions. The configuration that would normally be achieved, absent additional failures, is for the CCW loops to be separated while the ASW loops remain crosstied, a configuration where PG&E states that a single active or a single passive failure can be accommodated without loss-of-safety function.

2.1 Reactor Systems Evaluation

The licensee states:

> "Short-term is defined as ‘the first 24 hours following the incident....’ Long-term is defined as ‘the remainder of the recovery period following the short-term.’"

The staff finds 24 hours is acceptable for initiation of the long-term when addressing ASW and CCW system operation with respect to the licensee described actions.

The licensee states that the FSAR Update describes the passive leak criterion applicable to the ASW and CCW systems as the capability to withstand a leak of 50 gpm for 30 minutes to provide time to take action to mitigate the failure. Should a single failure disable a mitigation method, the staff will allow certain manual corrective actions, depending on the nature of the action and the time available, to establish an alternate method(s) or, in some circumstances, to replace a supporting function. For example, making an electrical connection to a pre-installed cable that meets all regulatory requirements would be credited if sufficient time exists, procedures are in place, training has been accomplished, and environmental conditions permit the action. Laying new cable would not be credited because actions to repair the cause of a single failure cannot be credited in meeting regulatory requirements.

In general, straightforward operator actions within the control room are considered acceptable if 10 minutes is assumed for the action, and actions outside the control room are considered acceptable if 20 minutes or more is allowed, depending upon complexity. For specific cases, the staff will consider the conditions in assessing proposed acceptable times.

The potential configurations discussed by PG&E and the staff’s findings are as follows:

(1) ASW Loops and CCW Loops Crosstied

PG&E. The systems will perform their safety function following a single active failure. An ASW leak (passive failure) of 50 gpm would not significantly affect ASW system performance, and could be tolerated for longer than the 30 minutes specified in the FSAR Update for mitigation of the effects of the passive failure. The crosstied CCW system is designed to remain functional with a 200 gpm leak for 20 minutes, which bounds a passive leak requirement of 50 gpm for 30 minutes. However, for potential conditions that are outside the design basis, the ASW system can tolerate a relatively large pressure boundary failure whereas the CCW system is less tolerant because of the limited inventory in the CCW system surge tank.

NRC. This configuration is not vulnerable to a single active failure and provides 30 minutes in which to take operator action to address a single passive failure of 50 gpm. PG&E plans a TSC evaluation of plant status within 24 hours after initiation of the LOCA, including a decision to either remain in this configuration or change to a different configuration. Should a single passive failure occur after 24 hours that impacts operation, PG&E has described operator mitigation actions that do not constitute repairs and it states there is sufficient time to accomplish the actions. Since the mitigation actions are straightforward valve manipulations, the staff agrees. Therefore, this configuration is acceptable for meeting both the single active and single passive failure requirements.

(2) ASW Loops Separated and CCW Loops Separated (After ~10½ Hours)

PG&E. A single active failure causing Vital Bus F to fail will cause CCW flow to be lost in one train and ASW cooling flow to be lost to the other train. Similarly, loss of Vital Bus G would result in loss of ASW flow to one CCW loop, so that the CCW loop's heat exchanger is not cooled, with the simultaneous loss of the RHR pump on the other train. Either situation, if unmitigated, constitutes a potential failure to meet the single active failure criterion. Following a vital bus failure, immediate action may be required to crosstie the ASW loops to reestablish ASW cooling to the required CCW heat exchanger. Therefore, while in this configuration, TSC guidance requires stationing personnel to closely monitor the status of vital Buses F and G and plant procedures address cross tying the ASW loops. The motors for both ASW loop crosstie valves are powered from Bus H and these valves are controlled from the main control room.

NRC. The train-separated configuration satisfies the single passive failure requirement since the CCW and ASW systems are not vulnerable to single loss of inventory events. However, an active failure can cause the CCW supply temperature to exceed the design maximum in 3 to 5 minutes at ~10½ hours after a LOCA. This time is too short to meet a minimum 10 minute acceptance criterion and the licensee has not attempted to fully justify a shorter time criterion. Consequently, the staff has not assessed this configuration with respect to the single active failure criterion. Despite this, the staff notes that, should a single passive failure have occurred or is expertly judged to be imminent, then the single failure will have occurred or may be reasonably assumed to have occurred, and it is not necessary to postulate a second (active) failure. Consequently, this configuration may have practical use should events exceed the design basis.

(3) ASW Loops Crosstied, CCW Loops Separated

PG&E. The trains would withstand a single active or a single passive failure without loss of safety function. A vital bus failure causes, at most, loss of cooling to one CCW loop. Because the ASW loops are crosstied, flow from the redundant ASW pump is split between the two CCW heat exchangers, but one ASW pump can provide adequate cooling of the operating CCW loop. Because the CCW loops are separated, a loss of inventory (passive failure) event does not cause failure of the safety function. As discussed above, an ASW leak of 50 gpm would not significantly affect ASW performance because of the reduced heat load 24 hours after the accident, and could be tolerated for longer than the 30 minutes specified in the FSAR Update for mitigation of the effects of the passive failure.

NRC. This configuration and operation are acceptable at any time following a LOCA provided the design-basis calculations support operator intervention times consistent with the operator action times found acceptable above. The licensee has established this to be the case at ~10½ hours after a LOCA, and, on the basis of the information provided, the staff believes this could also be shown to be true for shorter times.[3]

(4) ASW Loops Separated, CCW Loops Crosstied

PG&E. This configuration is considered unlikely based upon the TSC guidance which establishes preference for a CCW separated configuration to avoid the sensitivity of the CCW system to loss-of-inventory failures. An active failure of a vital bus is mitigated by crediting operator action to restore ASW cooling by crosstying the ASW loops. A passive failure would be mitigated by separating CCW loops, as discussed for Configuration (1) above.

NRC. ASW is not susceptible to a passive failure in this configuration and the CCW crosstied condition means that a passive failure can be mitigated as discussed for Configuration 1 above.

Loss of Bus F (an active failure) causes loss of the "A" CCW heat exchanger and loss of the "B" CCW pump, but both CCW loops continue to have flow, although at a reduced rate, because of the crosstie. Thus, the "B" CCW water is cooled before being circulated through the "B" CCW loads. Conversely, "A" CCW water will not be cooled before being circulated through the "A" loads, and will be roughly at the temperature of the mixed "A" and "B" CCW water at the respective pumps. At least one of each of the key components (residual heat removal, safety injection, containment coolers, etc.) will continue to function in the "B" CCW loop, thus maintaining functionality for the "B" loop.

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[3]In a telephone conference with the licensee on March 19, 1999, the licensee stated that CCW system heat loads are reduced to about half the pre-failure value if a vital bus failure of concern occurs. This is true at the time of failure, but the staff does not accept this to be true following the failure because decay heat generated after the failure will cause temperatures to increase until the heat removal and heat generation mechanisms are again in balance. This error does not affect the staff's conclusion.

PG&E estimates that mixing between the "A" and "B" CCW pumps would be limited in this configuration, with the consequence that the "A" CCW loop would heat almost as rapidly as in Configuration (2) above, while the "B" CCW loop remained functional. Thus, operator action would be required in almost the same 3 to 5 minute time as in Configuration (2) to prevent exceeding equipment qualification limits in the "A" CCW loop. For review purposes, we assume it is necessary to meet such limits since CCW is crosstied and failure in "A" cannot be accepted if it leads to failure in "B." Consequently, this configuration does not meet the single failure criterion, if the criterion for acceptance is that a minimum of 10 minutes be available. However, similar to Configuration 2, this configuration may have practical use for operation when an event has exceeded the design basis.

Aspects of the above rationale also apply if loss of Bus G causes loss of the "B" CCW heat exchanger.

An action to evaluate CCW/ASW train separation is specified in the procedures that address transfer to hot leg recirculation at ~10½ hours. Plant Engineering Procedure PEP EN-1, Rev. 9, "Plant Accident Mitigation Diagnostic Aids and Guidelines," dated November 2, 1998, provides the following guidance:

"Due to its vulnerability to a loss of inventory, the CCW system should be split into separate trains as soon as possible if plant conditions are acceptable."

"Due to the potential for a loss of the CCW system function in the event of a bus failure, the ASW system should not be split into separate trains unless it is believed that the loss of the ASW system pressure boundary is imminent."

Thus, Configuration 3 above, is the expected long-term configuration. Configurations 2 and 4 have not been established to meet the single failure criterion and their use at this time would be inconsistent with that criterion unless necessary to mitigate an actual or imminently expected failure. Use of Configurations 2 and 4 following occurrence of a single failure is outside the scope of this review since postulation of a second failure places operation outside the design basis.

<u>FSAR Changes</u>

PG&E provided marked-up FSAR Update pages as part of the LAR, but has accomplished a more recent FSAR Update revision that replaces the LAR version (Revision 12, September 1998). We have audited Revision 12 and found several statements to be misleading. These include:

(1) At the end of Section 9.2.7.1, Design Bases, the FSAR Update discusses an ASW/CCW design that permits alignment into two separate loops. This is Configuration (2) above, which by Procedure EN-1 is not a likely configuration. It is also a configuration the staff did not accept for meeting licensing requirements because of the short time available for mitigation of certain active failures, nor does the licensee claim use of this procedure to meet its licensing requirements. Yet, the FSAR Update states "However, during post-LOCA split train operation, operator action is required to recover from specific active

failure scenarios, which could otherwise lead to a loss of all vital equipment cooling." In the letter dated November 3, 1999, this was revised by removing the above statement and by inserting, "During post-LOCA long term recirculation, the ASW system should remain cross-tied to assure that any active failure in the ASW or CCW system would not result in the loss of CCW system cooling. While vulnerable to a passive failure in this configuration, the ASW system capacity is such that the ASW system function would not be affected. A decision to split the ASW system into separate trains to mitigate a passive failure would be made by the Technical Support Center if it became required." This FSAR Update modification is a more accurate and understandable discussion of the configurations to be used.

(2) At the end of Section 9.2.7.2, System Description, the FSAR Update states "In the long term post-accident recirculation, the ASWS may be aligned into two separate redundant trains, each consisting of a pump, supply header and a CCW heat exchanger. This configuration provides full protection against a passive failure and provides the minimum required long term cooling requirements." This is either Configuration (2) or (4) above, both of which are unlikely via Procedure EN-1, have not been established to meet licensing requirements, and are not claimed with respect to licensing requirements by the licensee’s amendment request (which pre-dates the FSAR Update amendment). The letter dated November 3, 1999, removes these statements and inserts the statement, "A decision to split the ASW system into separate trains to mitigate a passive failure would be made by the Technical Support Center if it becomes required."

(3) The end of the second paragraph of Section 9.2.7.2.7, Heat Rejection Capability, states “However, in this split train configuration, operator actions may be required to realign the ASW and CCW systems to prevent loss of all cooling to containment and safety-related equipment following specific active failure scenarios.” This appears to be Configuration (2) and the above Item (1) comments apply. In the letter dated November 3, 1999, these statements are removed.

Although these removed statements are not false, they are misleading, not readily understood, and discuss configurations that are not part of the licensing basis. Nor are the likely licensing basis configurations addressed in a manner that most readers will comprehend.

The NRC staff finds two of the four configurations acceptable. The configurations with ASW loops and CCW loops both separated and ASW loops separated with CCW loops cross-connected were not justified for meeting licensing requirements because operator action time to mitigate an active failure is shorter than generally acceptable without additional justification, and the licensee has not elected to submit additional justification. The staff notes, however, that these configurations may be useful should beyond-design basis conditions be encountered.

2.2 Electrical Evaluation

The design of the CCW and ASW systems makes them susceptible to a single failure. Because of the design of the electrical distribution system, these mechanical systems are operated with both trains cross-tied. These systems are vulnerable to passive failure when they are cross-tied and to active failures when trains are split.

Specifically, there are three Class 1E buses (F, G, and H). The components in the ASW, CCW and RHR are powered from a mix of these three buses such that a loss of one electrical bus could affect the system from performing their safety functions. Prior to this change, protection from a passive failure on the ASW and CCW systems was ensured by splitting these systems into two separate cooling trains. With the trains separated, a single failure causing a loss of vital Bus F would result in the loss of CCW flow on one CCW train and the loss of the ASW cooling flow to the other CCW train. This results in a total loss of heat removal from the containment. Similarly, a single failure causing a loss of vital Bus G would result in the loss of ASW cooling flow to one loop (B) such that the RHR heat exchanger on that loop is not cooled, and the other RHR loop (a) is not available as the RHR pump is powered from the bus, resulting in a total loss of RHR function. Therefore, the systems are vulnerable to passive failure when crosstied and to active failure when the trains are split.

The FSAR Update requires that DCPP be capable of tolerating a single active or passive failure without the loss of safety function. Each of the ESF trains is designed to mitigate a single failure during the period of recovery following an accident without loss of its protective function. This period of recovery consists of two segments, the short-term period and the long-term period. During the short-term period (first 24 hours), the single failure is limited to a failure of an active component to complete its function as required. Should the single failure occur during the long-term (remainder of the recovery period following the short-term), the related ESF system is designed to mitigate an active failure or a passive failure without loss of its protective function. To address the single active failure, the licensee revised the plant procedures such that train separation of the ASW and CCW systems after the transfer to hot leg recirculation following a LOCA is not required. The licensee implemented these changes to Emergency Operating Procedure E-1.4, "Transfer to Hot Leg Recirculation," for Units 1 and 2, respectively, as a corrective action to mitigate the effects of a single failure.

PEP EN-1 was revised to provide guidance to the TSC staff for making a decision regarding separation of the ASW and CCW trains after evaluation of plant conditions within 24 hours of event initiation. The TSC staff takes into consideration the physical integrity of the trains, availability of active components, and reliability of the power sources. Based on the guidance available to the TSC in PEP EN-1, the preferred configuration for the CCW system is to split the system into separate trains as soon as possible, due to its vulnerability to a loss of inventory (passive failure), if plant conditions are acceptable. Due to the potential for a loss of the CCW system cooling function in the event of a bus or EDG failure, the ASW system would not be split into separate trains unless it is believed that the loss of the ASW system pressure boundary is imminent. In this crosstied ASW train configuration, a bus failure will disrupt the cooling to, at most, one CCW loop. If the ASW system is split into separate trains, then immediate action would be required to crosstie the trains to reestablish ASW cooling to the required CCW heat exchanger, if a failure affecting vital 4 kV Bus F or G occurs.

The licensee states that alternate configurations, described below, are acceptable, but would require operator action to mitigate the effects of a single failure. These operators' actions are consistent with the previously approved actions required to separate the ASW and CCW trains. The licensee evaluated the consequences of a passive or active failure in the following post-LOCA configurations. This evaluation has only addressed the failures of electrical portions of the ASW and CCW systems:

ASW and CCW Trains Crosstied

When the ASW and CCW system trains are crosstied, the systems are able to mitigate a single active failure and still perform their safety function as explained earlier.

ASW System Trains Crosstied/CCW Systems Trains Separated

If the ASW and CCW system are aligned in accordance with the guidance on train separation provided in PEP EN-1 to the TSC, the system would be able to withstand a single active failure. A failure of a vital bus could result in the loss of an ASW pump. Because the ASW trains are crosstied, the flow from the redundant ASW pump is split between the two CCW heat exchangers. Because of the reduced heat load on the system, one ASW pump can provide cooling of the operating CCW trains.

ASW and CCW Trains Separated

Based on the guidance in PEP EN-1 to the TSC, the licensee states that the ASW would not be split into separate trains unless it is believed that the loss of the system pressure boundary is imminent. If a single failure affecting vital Bus F or G occurs while both the ASW and the CCW systems are split into separate trains, the plant procedures, in accordance with the TSC, would require the crosstyping of the ASW trains to reestablish ASW cooling to the required heat exchanger. This assures power to the valves in the event of a loss of vital 4 kV Bus F or G supplying the ASW pump motors.

ASW System Trains Separated/CCW Systems Trains Crosstied

A failure of a vital bus is mitigated by taking credit for operator action to restore ASW cooling by crosstying the ASW trains.

The staff evaluated the licensee's submittal and determined that the changes in plant operation provide flexibility for responding to a failure in the electrical system during long-term recovery period following a LOCA, while maintaining the ability of the ASW and CCW systems to perform their safety function. Based on the above, the staff concludes that the failures of the electrical portion of the ASW and CCW systems have been adequately addressed in the overall analysis of the ASW and CCW systems.

2.3 Plant Systems Evaluation

The licensee's proposed change to eliminate the procedural requirement to separate the ASW/CCW system trains as part of the post-LOCA response would remove the single active failure vulnerabilities. Instead, according to procedures, the decision to separate the

ASW/CCW trains following a LOCA would be made by the TSC after an evaluation of the plant conditions. The recommended configuration calls for the CCW trains to be separated and the ASW system to remain crosstied. In this configuration, the design can mitigate a single active or passive failure without the loss of safety function. Alternative configurations are acceptable, but would require operator actions to mitigate the effects of a single passive failure.

A crosstied ASW system can withstand a single passive failure because it is a once-through moderate energy seismic Category I system with a limited design basis leak and long-term post-LOCA ASW flow requirements are significantly reduced. Therefore, the time for operator actions to separate the ASW trains following a passive failure is not considered critical. Also, in the crosstied configuration, a bus failure will disrupt cooling to, at most, one CCW loop. Thus, crosstied ASW operation is preferable to separate train operation for both normal operation and long-term post-LOCA response.

For a passive long-term post-LOCA failure of the CCW system with separated CCW trains, operator actions must be taken to separate the trains and minimize the loss of inventory because of the closed loop design of the system. The CCW system is designed to maintain its function with a 200 gpm leak for 20 minutes with the trains crosstied. The 200 gpm leakage rate is the design basis leak rate for the CCW at Diablo Canyon. In SSER 16 for DCPP, the staff identified that the use of a 200 gpm leak rate for the evaluation of system capability was acceptable for normal system operation (i.e., with the CCW trains crosstied). While the recommended or preferred configuration (CCW separated and ASW crosstied) can withstand a single passive or active failure without operator action, operator action to separate the CCW or ASW system following a passive failure of either of these systems is also acceptable for long-term post-LOCA scenarios. Reliance on operator action to mitigate a passive failure in the long-term post-LOCA recovery is consistent with the required response to an ASW/CCW passive failure during normal operation. Therefore, the staff has previously concluded that operator actions are acceptable to respond to a passive failure of the ASW/CCW systems without loss of system function. Because the proposed change in ASW/CCW operation still provides adequate protection against long-term post-LOCA passive failure and does not affect the systems functions during normal operation, the staff concludes that the ASW/CCW systems will continue to meet the existing licensing and design basis.

Based on its review, the staff concludes that the proposed changes to the manner in which passive failures of the ASW and CCW systems are mitigated during the long-term post-LOCA recovery period are necessary to eliminate single active failure vulnerabilities and are acceptable because they maintain the original licensing and design basis regarding protection against a single passive failure during post-LOCA recovery.

3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the California State official was notified of the proposed issuance of the amendments. The State official had no comments.

4.0 ENVIRONMENTAL CONSIDERATION

These amendments change a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on such finding (63 FR 53953). Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

5.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above that (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 amendments will not be inimical to the common defense and security or to the health and safety of the public.

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Date: January 13, 2000