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RECIP.NAME RECIPIENT AFFILIATION
STOLZ,J.F. Light Water Reactors Branch 1

SUBJECT: Forwards evaluation of how auxiliary feedwater sys meets such requirement in SRP 10.4.9 & Branch Technical Position ASB-10-1 in response to 791130 meeting w/NRC in Bethesda,MD & NRC 800310 ltr.

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March 13, 1980

Mr. John F. Stolz, Chief
Light Water Reactors Branch No. 1
Division of Project Management
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Re: Docket No. 50-275
Docket No. 50-323
Diablo Canyon Units 1 and 2

Dear Mr. Stolz:

Pacific Gas and Electric Company was represented at an NRC meeting held on November 30, 1979 in Bethesda, Maryland. At this meeting, several applicants with near-term OL plants were advised of requirements resulting from the NRC's evaluation of the Auxiliary Feedwater Systems (AFWS) of 33 operating units.

The attached material is submitted in response to that meeting and to Part (a) of an NRC letter dated March 10, 1980, which requests an evaluation showing how Diablo Canyon's Auxiliary Feedwater System (AFWS) meets each requirement in Standard Review Plan 10.4.9 and Branch Technical Position ASB-10-1. The material also references the appropriate FSAR paragraphs as requested during the meeting.

The additional information requested both in the letter and at the meeting will be submitted as soon as it is available.

Kindly acknowledge receipt of this material on the enclosed copy of this letter and return it to me in the enclosed addressed envelope.

Very truly yours,

Philip A. Crane, Jr.

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DSE
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Attachment (40)

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ATTACHMENT
Comparison of NRC Standard Review Plan 10.4.9 Rev. 1 to Diablo Canyon Final Safety Analysis Report

SRP 10.4.9 Rev. 1 Section III. Review Procedures	Summary of FSAR Text and Reference To Applicable Sections
1. The SAR is reviewed to determine that the system description and piping and instrumentation diagrams (P&IDs) identify the AFS equipment and arrangement that is used for normal operation and for safe plant shutdown (essential) operation. The system P&IDs, layout drawings, and component descriptions and characteristics are then reviewed to verify that:	The AFW System Description is found in FSAR section 10.4.8., pages 10.4-16, 17, & 18. The AFW System P&IDs are found on Fig. 3.2-03, sheet 2, Fig. 3.2-04, sheet 4, and Fig 3.2-16, sheets 3 & 8. Component descriptions and characteristics are included in the System Description, pages 10.4.16-18.
a. Minimum performance requirements for the system are sufficient for the various functions of the AFS.	Minimum performance requirements and description of the AFW System capability to meet performance requirements are found in Section 10.4.8, pages 10.4-18 to 20, and Section 15.2.8, pages 15.2-36 to 39.
b. Essential portions of the AFS are insolable from non-essential portions, so that system performance is not impaired in the event of a failure of a non-essential component.	Essential portions of the AFWS are isolable from non-essential portions, as can be shown on the system P&IDs. Figures 3.2-03, sheet 2, 3.2-04, sheet 4, and 3.2-16, sheets 3 & 8.
c. Component and system descriptions in the SAR include appropriate seismic and quality group classifications, and the P&IDs indicate any points of change in piping quality group classification.	The AFWS is Seismic Design Class I in accordance with Reg. Guide 1.29. The AFWS pumps, valves, and piping are Quality Group C in accordance with Reg. Guide 1.26, Rev. 1. FSAR Section 3.2, pages 3.2-4, 3.2-9 and Table 3.2-4, sheets 8, 15, 23, 27 & 29. PG&E P&IDs do indicate points of change in piping quality group classification.
d. Design provisions have been made that permit appropriate inservice inspection and functional testing of system components important to safety. It is acceptable if the SAR information delineates a testing and inspection program and if the system drawings show the necessary recirculation loops around pumps or isolation valves as may be requires by this program.	Provisions have been made to permit preliminary and Inservice Inspection and Functional Testing of system components. FSAR page 10.4-20, FSAR Table 14.1-1, sheet 11, FSAR Section 16.5.6, page 16.5-23. While not stated explicitly in FSAR Chapter 16, the AFWS piping will also have periodic Inservice Inspection (ISI) in accordance with ASME B&PVC Section XI. A detailed ISI plan for the AFWS piping, valves, and pump will be submitted to the NRC for review.

2. The reviewer verifies that the system safety function will be maintained as required, in the event of adverse environmental phenomena, breaks or cracks in fluid system piping outside containment, system component failures, loss of an onsite motive power source, or loss of offsite power. The reviewer uses engineering judgment and the results of failure modes and effects analyses to determine that:

   a. The failure of portions of the system or of other systems not designed to seismic Category I standards and located close to essential portions of the system, or of non-seismic Category I structures that house, support, or are close to essential portions of the AFS, will not preclude operation of the essential portions of the AFS. Reference to SAR sections describing site features and the general arrangement and layout drawings will be necessary, as well as the SAR tabulation of seismic design classifications for structures and systems.

   Failure of Non-Seismic Class I systems and components will not preclude the required operation of the Auxiliary Feedwater System. FSAR Sections 3.2, 3.6A, & 9.2 (page 9.2-235 & 25). A tabluation of seismic design classifications for structures and systems is given in Table 3.2 Sections I to IV.

   b. The essential portions of the AFS are protected from the effects of floods, hurricanes, tornadoes, and internally or externally generated missiles. Flood protection and missile protection criteria are discussed and evaluated in detail under the SRP Section 3 series. The location and design of the system, structures, and pump rooms (cubicles) are reviewed to determine that the degree of protection provided is adequate. A statement to the effect that the system is located in a seismic Category I structure that is tornado missile and flood protected, or the components of the system will be located in individual cubicles or rooms that will withstand the effects of both flooding and missiles is acceptable.

   The AFW pumps and two of four pipe runs are located in the auxiliary building which is a Seismic Class I structure. Two of four pipe runs are located outside. The Condensate Storage Tank is located outside.

   The tornado resistance of the Auxiliary Building is found on FSAR page 3.3-96 and in FSAR Table 3.3-2, sheet 1. The tornado resistance of the Condensate Storage Tank is found on FSAR pages 3.3-9, 3.3-19, and in Table 3.3-2, sheet 3. The tornado resistance of the outdoor AFW piping is found on FSAR page 3.3-15. For these cases, the effects of tornado-induced missiles were considered and the results given.

   Potential internally generated missiles that could effect the AFWS are described on FSAR page 3.5-12 and evaluated on FSAR page 3.5-15d.

   The potential for flooding of the AFWS is discussed on FSAR pages 3.6A-73, 92.-23c, 9.2-25b, 10.4-13b, 10.4-15, and 10.4-20.

c. The essential portions of the system are protected from the effects of high and moderate energy line breaks in accordance with Branch Technical Position ASB 3-1. Layout drawings are reviewed to assure that no high or moderate energy piping systems are close to essential portions of the AFS, or that protection from the effects of failure will be provided. The means of providing such protection will generally be given in Section 3.6 of the SAR and procedures for reviewing this information are given in SRP Section 3.6.

The AFWS is protected against the effects of high and moderate energy line breaks as described in FSAR Section 3.6A. Specific discussion is found on FSAR pages 3.6A-17, 19, 20, 21, 31-37, 46-49, 60, 63, 69, 77, 78.

d. Essential components and subsystems necessary for safe shutdown can function as required in the event of loss of offsite power. The SAR is reviewed to see that for each AFS component or subsystem affected by the loss of offsite power, system flow and heat transfer capability meet minimum requirements. Statements in the SAR and the results of failure modes and effects analyses are considered in assuring that the system meets these requirements.

All essential components and subsystems necessary for the functioning of the AFWS are automatically transferred to diesel-generator emergency power sources in the event of the loss of offsite power. Specific FSAR descriptions are as follows:

AFWS Pumps - FSAR Section(s) 8.3.2, pages 8.3-3 to 8.3-12 and FSAR Table(s) 8.3-1 to 8.3-5, FSAR Figures 8.3-4, 7.3-17, 18, 50.
AFWS Control Valves - FSAR page 8.3-11, FSAR Figures 8.3-6, 7, 8 & 7.3-14.
AFWS Actuation Instrumentation - FSAR Section(s) 7.3.1, 7.5.1, 7.6.1, FSAR Figures 7.3-8, 51, FSAR Figure 83.-17.
AFWS Flow Indication & S.G. -, FSAR Sections 7.5.1, 7.6.1
Level Indication -, FSAR Tables 7.5-1, 3, FSAR Figures 7.3-51, 8.3-17.
Auto-Transfer to Diesel-Generators - FSAR pages 8.3-5 to 8.3-9b, FSAR Figures 8.3-9, 10, 11, 16.
Safety Evaluation for Loss of Offsite Power - Section 15.2.8.

e. The system is designed with adequate redundancy to accommodate a single active component failure without loss of function.

Statements regarding the capability of the AFWS to withstand single failures can be found on FSAR pages 6.5.1 & 10.4-19.

f. Diversity in pump motive power sources and essential instrumentation and control power sources has been provided. The diverse system including pump(s), controls and valves should be independent of offsite AC power sources in accordance with the guidelines of Branch Technical Position ASB 10-1.

The Diablo Canyon Auxiliary Feedwater System pumps, controls, and valves are powered from diverse power source specific discussion is found in FSAR Section(s) 7.6.1, 8.1.3 and 10.4.8.

SRP 10.4.9 Rev. 1 Section III, Review Procedures	Summary of FSAR Text and Reference To Applicable Sections
g. The system is designed with adequate instrumentation to automatically initiate auxiliary feedwater flow to the steam generators upon receipt of an actuation signal. The initiation signal should start all auxiliary feedwater pumps and supporting systems, align the auxiliary feedwater sources, and open flow paths from the auxiliary feedwater pumps to the steam generator(s).	The description and analysis of the AFW actuating instrumentation is found in FSAR Section(s) 7.3.1, 7.4.1 and FSAR Figures 7.3-8, 17, 18, 51.
h. The system is designed with the capability to manually initiate the protective actions necessary so that the auxiliary feedwater system design satisfies the recommendation of Regulatory Guide 1.62.	The required components of the AFWS can be actuated manually as described in FSAR Section(s) 7.4.1 (pages 7.4-3, 4) and FSAR Figures 7.3-14, 16, 17 & 18.
i. The AFS is designed with redundant instrumentation so that the system will automatically limit or terminate auxiliary feedwater flow to a depressurized steam generator, and to assure that the minimum required flow is directed to the intact steam generator(s).	The instrumentation that will automatically limit the feedwater flow to a depressurized steam generator is not described in the Diablo Canyon FSAR. Instrumentation is provided in the motor-driven pump discharge to sense low pump discharge pressure indicative of a depressurized steam generator. In a low pump discharge situation, control valves are automatically closed to regain discharge pressure. This automatic action limits flow to any depressurized steam generator and assures that the required flow is directed to the intact steam generators. No such instrumentation is provided for the turbine-driven AFW pump. Remote manual action by the plant operator is required to terminate flow to a depressurized steam generator.
j. The AFS is designed with sufficient flow capacity so that the system can remove residual heat over the entire range of reactor operation and achieve a cold shutdown condition.	Flow capacity requirements for the AFWS are found in FSAR Section(s) 10.4.8, pages 10.4-18 to 20 and Section(s) 15.2.8, pages 15.2-36 to 39.