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JAN 10 1977

Docket Nos.: 50-275, 50-323

Pacific Gas and Electric Company
ATTN: Mr. John C. Morrissey
Vice President & General Counsel
77 Beale Street
San Francisco, California 94106

Gentlemen:

REACTOR VESSEL OVERPRESSURIZATIONS - DIABLO CANYON UNITS 1 AND 2

Several instances of reactor vessel overpressurizations have occured in pressurized water reactors in which the Technical Specifications implementing Appendix G to 10 CFR Part 50 have been exceeded. The majority of cases have occured during cold shutdown, during which time the primary system was in a water solid condition. These overpressurization events have been initiated by a variety of causes, including:

(1) Isolation of the residual heat removal system/letdown system while charging to a water solid primary system,

(2) Thermal expansion following the starting of a primary coolant pump due to stored thermal energy in steam generators,

(3) Inadvertent actuation of safety injection accumulators, and

(4) Initiation of operation of a reactor coolant pump or a high pressure safety injection pump.

In essentially all of the events reported, a single personnel error, equipment malfunction or procedural deficiency has been sufficient to cause the event.

In view of the potential seriousness of exceeding the limits of Appendix G to 10 CFR Part 50, we believe that appropriate steps should be taken promptly by all pressurized water reactor licensees to minimize the likelihood of additional occurrences of reactor vessel overpressurization. To that end we recently completed a series of

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meetings with several pressurized water reactor licensees and nuclear steam supply system suppliers in which we discussed the overpressurization events and assessed the measures that are currently being employed to either avoid or reduce the probability of similar occurrences. Examples of measures identified by the various licensees include:

(1) Complete avoidance of water solid conditions by either maintaining a pressurizer steam bubble, or by providing a low pressure nitrogen blanket in the pressurizer when a steam bubble cannot be maintained,

(2) Disabling high pressure injection and safety injection pumps by disconnecting electrical power supplies when at low primary system temperatures,

(3) Installation of dual setpoint pressurizer power relief valve(s) to provide protection against exceeding Appendix G limits while at low primary system temperatures,

(4) Minimization of time at water solid conditions and upgrading plant procedures to include appropriate warnings and cautions when such operations are necessary, and

(5) Installation of relief valves in charging pump discharge lines with a setpoint to provide protection against exceeding Appendix G limits

It was noted in our discussions with the pressurized water reactor licensees that, for the majority of those plants involved, not all potential overpressurization events would be prevented by the measures they had identified, and that some of the measures may have undesirable effects on reactor safety.

Based on the information gathered to date, we have concluded that all pressurized water reactor licensees should evaluate their system designs to determine the vulnerability to overpressurization events. Accordingly, you are requested to provide:

(1) An analysis of the reactor coolant system response to pressure transients that can occur during startup and shutdown. Any design modifications determined to be necessary in order to preclude exceeding Appendix G limits are to be incorporated in this analysis. The analysis should include a plot of pressure as a function of time until termination of the event. The analysis should assume the most limiting initial conditions (e.g., one residual heat removal train operating or available

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for letdown while other components such as pressurizer heaters and charging pumps and one or more reactor coolant pumps are in normal operation when the system is water solid) with the worst single failure or operator error as the initiating event. Justification should be provided for the choice of limiting conditions and worst single failure or operator error assumed in the analysis,

(2) A description of those design modifications determined to be necessary, including equipment performance specifications and system operational sequences. The design basis used in the choice of equipment should be included, and

(3) A schedule for the prompt implementation of the proposed design modifications.

The basic criteria to be applied in determining the adequacy of overpressurization protection are that no single equipment failure or single operator error will result in Appendix G limitations being exceeded.

For those situations in which the necessary design changes identified cannot be implemented within the next few months, you should identify short-term measures to reduce the likelihood that overpressurization events will occur in the interim period until the permanent design changes can be made. Short term measures should be identified separately for immediate implementation subject to the terms and conditions of your license. Short term measures might consider some combination of, but would not be limited to, the following suggestions:

(1) Procedural changes to minimize the time in which the primary system is in a water solid condition,

(2) Upgrading existing plant procedures and administrative controls to assure that appropriate warnings and cautions are included to alert the operator whenever the potential for primary system overpressurization exists,

(3) Providing alarms or indications to alert the operator whenever primary system pressure increases approach the Appendix G limits,

(4) Introducing temporary plant modifications for pressure relief, and

(5) Assigning additional personnel to monitor plant operations when the reactor coolant system is water solid.

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You should be aware that the design modifications required to preclude or minimize the probability of reactor vessel overpressurization events are plant dependent, and that the examples given may or may not be adaptable to your specific system design. In addition, proper consideration must be given to the potential effects of both the short term and long term measures you consider to insure that other aspects of nuclear safety are not compromised.

To verify compliance with Appendix G pressure-temperature limits during startup and shutdown, you should assure that the appropriate instrumentation is installed to provide a continuous permanent record over the full range of both pressure and temperature. This instrumentation should be in service during long periods of cold shutdown as well as during startup and shutdown operations. Reliance upon the plant computer to reconstruct a pressure transient is not considered sufficient because of the likelihood of computer down time especially during plant shutdown conditions.

We request that within 20 days after receipt of this letter you notify us that you will provide all the information requested within 60 days or explain why you cannot meet this schedule and provide the schedule that you will meet.

This request for generic information was approved by GAO under a blanket clearance number B-180225 (R0072); this clearance expires on July 31, 1977.

Sincerely,

Original Signed by
John F. Stolz

John F. Stolz, Chief
Light Water Reactors
Branch No. 1
Division of Project Management

cc: See Page 5

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SURNAME ➔	DAllison:klj	JStolz				
DATE ➔	1/7/77	1/10/77				

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cc: Philip A. Crane, Jr., Esq.
Pacific Gas and Electric Company
77 Beale Street
San Francisco, California 94106

Andrew J. Skaff, Esq.
California Public Utilities Commission
350 McAllister Street
San Francisco, California 94102

Mr. Frederick Eissler, President
Scenic Shoreline Preservation
Conference, Inc.
4623 More Mesa Drive
Santa Barbara, California 93105

Ms. Elizabeth E. Apfelberg
1415 Cazadero
San Luis Obispo. California 93401

Ms. Sandra A. Silver
Mr. Gordon A. Silver
5055 Radford Avenue
North Hollywood, California 91607

Paul C. Valentine
400 Channing Avenue
Palto, Alto, California 94301

Yale I. Jones, Esq.
100 Van Ness Avenue
19th Floor
San Francisco, California 94102

James A. Geocaris
Center for Law in the Public
Interest
10203 Santa Monica Boulevard
Los Angeles, California 90067

Ms. Raye Fleming
1746 Charro Street
San Luis Obispo. California 93401

Mr. John Forster
985 Palm Street
San Luis Obispo. California 93401

Mr. William P. Cornwell
P.O. Box 453
Morro Bay, California 93442

Mr. W. J. Lindblad,
Project Engineer
Pacific Gas and
Electric Company
77 Beale Street
San Francisco, California 94106

Mrs. Thelma Hirdler
811 Fair Oaks Avenue
Arroyo Grande, California 93420

Mr. W. C. Gangloff
Westinghouse Electric Corporation
P.O. Box 355
Pittsburgh, Pennsylvania 15230

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SURNAME➤						
DATE➤						