DISTRIBUTION
Document Control (50-275/373)
NRC PDR
L PDR
NSIC
PRC System
LB#3 Reading
JLee
JWilson
Attorney, OELD
GWKnighton
TNovak
ELJordan, IE
JMTaylor, IE
ACRS (16)

Docket Nos.: 50-275
and 50-3~~3~~2

NOV 1 5 1983

Mr. James O. Schuyler
Vice President - Nuclear Generation
Department
Pacific Gas & Electric Company
77 Beale, Room 1451
San Francisco, California 94106

Dear Mr.Schuyler:

Subject: Request for Additional Information - NUREG-0737, Item II.D.1 - Performance Testing of Relief and Safety Valves

Reference:
(1) Ltr. from P. Crane to F. Miraglia, dated 3/31/82
(2) Ltr. from P. Crane to H. Denton, dated 6/23/82
(3) Ltr. from J. Schuyler to F. Miraglia, dated 6/30/82
(4) Ltr. from P. Crane to H. Denton, dated 12/13/82

EG&G Idaho, under contract to the NRC staff, has reviewed the referenced Diablo Canyon Nuclear Power Plant, Units 1 and 2 submittals for TMI Item II.D.1 of NUREG-0737, Performance Testing of Relief and Safety Valves. Additional information is needed before the review can be completed. You are requested to furnish a response to the questions in Enclosure 1 and be prepared to discuss your responses in a meeting which will be scheduled within 60 days of the date of this letter withstaff from EG&G and NRC in Bethesda, Maryland.

If you have any questions about this request, contact the project manager, Hans Schierling at (301) 492-7100.

Sincerely,

Original signed by:
George W. Knighton

George W. Knighton, Chief
Licensing Branch No. 3
Division of Licensing

Enclosure:
As stated

cc: See next page

DL:LB#3
JWilson/yt
11/15/83

DL:LB#3
GWKnighton
11/15/83

Mr. J. O. Schuyler, Vice President
Nuclear Power Generation
c/o Nuclear Power Generation, Licensing
Pacific Gas and Electric Company
77 Beale Street, Room 1435
San Francisco, California 94106

Philip A. Crane, Jr., Esq.
Pacific Gas & Electric Company
Post Office Box 7442
San Francisco, California 94120

Mr. Malcolm H. Furbush
Vice President - General Counsel
Pacific Gas & Electric Company
Post Office Box 7442
San Francisco, California 94120

Janice E. Kerr, 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 Apfelberg
1415 Cozadero
San Luis Obispo, California 93401

Mr. Gordon A. Silver
Ms. Sandra A. Silver
1760 Alisal Street
San Luis Obispo, California 93401

Harry M. Willis, Esq.
Seymour & Willis
601 California Street, Suite 2100
San Francisco, California 94108

Mr. Richard Hubbard
MHB Technical Associates
Suite K
1725 Hamilton Avenue
San Jose, California 96125

Mr. John Marrs, Managing Editor
San Luis Obispo County Telegram Tribune
1321 Johnson Avenue
P. O. Box 112
San Luis Obispo, California 93406

Resident Inspector/Diablo Canyon NPS
c/o US Nuclear Regulatory Commission
P. O. Box 369
Avila Beach, California 93424

Ms. Raye Fleming
1920 Mattie Road
Shell Beach, California 93440

Joel Reynolds, Esq.
John R. Phillips, Esq.
Center for Law in the Public Interest
10951 West Pico Boulevard
Third Floor
Los Angeles, California 90064

Paul C. Valentine, Esq.
321 Lytton Avenue
Palo Alto, California 90064

Dr. William E. Cooper
Project Manager - 5511
Teledyne Engineering Services
130 Second Avenue
Waltham, Massachusetts 02254

Mr. Dick Blankenburg
Editor & Co-Publisher
South County Publishing Company
P. O. Box 460
Arroyo Grande, California 93420

Norton, Burke, Berry & French, P.C.
202 E. Osborn Road
P. O. Box 10569
Phoenix, Arizona 85064

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

David F. Fleischaker, Esq.
P. O. Box 1178
Oklahoma City, Oklahoma 73101

Arthur C. Gehr, Esq.
Snell & Wilmer
3100 Valley Center
Phoenix, Arizona 85073

Mr. Lee M. Gustafson, Director
Federal Agency Relations
Pacific Gas & Electric Company
1050 17th Street, N.W.
Suite 1180
Washington, DC 20036

Regional Administrator - Region V
US Nuclear Regulatory Commission
1450 Maria Lane
Suite 210
Walnut Creek, California 94596

Dr. Jose Roesset
3506 Duval Road
Austin, Texas 78759

Michael J. Strumwasser, Esq.
Special Council to the Attorney General
State of California
3580 Wilshire Boulevard, Suite 800
Los Angeles, California 90010

Mr. Thomas H. Harris
San Jose Mercury News
750 Ridder Park Drive
San Jose, California 95190

Mr. Mark Gottlieb
California Energy Commission
1111 Howe Avenue, MS 27
Sacramento, California 95825

Maurice Axelrad, Esq.
Lowenstein, Newman, Reis and Axelrad
1025 Connecticut Avenue, NW
Washington, DC 20036

REQUEST FOR ADDITIONAL INFORMATION

TMI ACTION NUREG-0737 (II.D.1)

RELIEF AND SAFETY VALVE TESTING

FOR

DIABLO CANYON UNITS 1 AND 2

Docket Nos. 50-275 & 50-323

October 1983

Questions related to the selection of transients and valve inlet conditions (Questions 1-5)

1. The limiting transient for the safety valves and PORVs could not be verified since it was not identified and since no dicussion was provided describing the methods used to select the limiting transient. A discussion identifying the limiting transient and providing the rationale leading to the selection of the transient should be provided.

2. Over pressure transients will cause the pressurizer sprays to activate adding moisture to the steam volume. When the safety valves (SRVs) lift or the power operated relief valves (PORVs) are opened they would be passing a steam-water mixture. Was this effect considered in the analyses done to select the transient that produced maximum loads on the discharge piping?

3. The submittals do not include a discussion of consideration of single failures after the initiating events. NUREG-0737 requires selection of single failures that produce maximum loads on the safety valves. A discussion should be provided describing how the single failure considerations required by NUREG-0737 are met.

4. The effect of SRV blowdown in excess of the ASME code limits of 5% should be considered to determine if any adverse effects on plant safety exist. An increased blowdown would also cause a higher rise in the pressurizer level during transients that result in the SRVs lifting. No discussion is provided discussing whether the level will reach the discharge piping connection resulting in a transition of flow through the SRVs from steam to a water-steam mixture. Details of the analyses evaluating the effects on safety and details of the analyses evaluating whether the water level will reach the discharge piping should be provided.

5. The safety valve evaluation did not address operation of the PORVs under water discharge conditions, such as cold overpressure protection. Will the PORVs be subjected to any water discharge transient when used for cold overpressure protection? If so, is the system adequate?

Questions related to the operability of the valves (Questions 6-8)

6. The submittals do not state what ring settings are to be used for the SRVs. The specific ring settings to be used should be provided. The backpressures are not given in the submittals. The submittals do not discuss the test valve performance to verify that the valve did perform satisfactorily. A comparison should be provided that demonstrates, with the specific ring settings and appropriate backpressures, that the valves will have stable operation for the Final Safety Analysis (FSAR) transients and will pass rated steam flow.

7. NUREG 0737 requires qualification of the block valve. Specific data demonstrating qualification of the block valve is not given in the submittals. A reference is made to a report by R. C. Youndahl indicating satisfactory performance for a similar valve. The EPRI tests demonstrated closure only with steam. Additional information should be provided to verify that testing with steam only provides adequate assurance that the valve will perform satisfactorily for the required plant conditions.

8. The opening times of the Masoneilan relief valves were found to be sensitive to the air supply pressure and the size of tubing used in the air supply system. Both the pressure and tubing size had to be increased during tests to reduce opening times to reasonable values. Are similar measures being taken on plant valves to assure sufficiently short opening times?

Questions related to analyses of the discharge piping (Questions 9-20)

9. Two valve opening sequences were considered in the piping submittal, the three SRVs opening simultaneously and discharging without PORV flow and the three PORVs opening simultaneously and discharging by themselves. These sequences however, may not bound the forces for all

possible valve opening sequences. The experience of EG&G Idaho indicates that maximum forces would be expected when the sequence of opening is such that the initial pressure waves from the SRVs opening reach a common junction simultaneously. Additional justification should be provided to demonstrate that the sequences considered in the submittal are adequate.

10. The submittal does not discuss the nozzle loads at the inlet or outlet flanges of the SRVs and the PORVs or stress analyses of other sections of the valves. Sufficient information should be provided so that the acceptability of the loads can be verified or appropriate references cited.

11. The submittal identifies the initial conditions for the SRV and PORV analyses. However, the method of handling the valve resistances is not described and the valve opening times and the corresponding flows are not reported. Since the ASME code requires derating the SRVs to 90% of predicted flow, actual flows of 111% of rated are likely. Additional information should be provided describing considerations of SRV derating and describing methods used to predict the flows for the SRVs and PORVs. The submittal states that the water in the loop seal remains upstream of the SRV until the valve is opened fully; is this conservative since the valve will simmer and not open fully until the loop seal water has passed through it?

12. The adequacy of the thermal-hydraulic analyses could not be verified since sufficient detail is not provided in the submittal. To provide for a more complete evaluation, additional discussion should be provided for the rationale used in selecting key parameters such as node spacing, time steps, valve flow area and choked flow junctions. Computer printouts of input and output for the limiting transient should also be provided.

13. The analysis did not compute the temperature distribution of the loop seal water for the proposed case with the loop seal pipe insulated but used a temperature distribution roughly consistent with that observed

during the Electric Power Research Institute (EPRI) Test 917. The assumed temperature distribution needs to be verified by analysis or measurement before the piping thermal hydraulic analysis can be considered satisfactory.

14. The submittal states that the SRV and PORV connections to the pressurizer were modeled as anchors. Was it verified that the vessel possesses no flexibility that could affect the piping response? The submittal does not mention the large displacement of the connection due to the thermal expansion of the pressurizer when heated to operating conditions. Verification should be provided that the displacements were considered in the stress analyses of the piping, pressurizer nozzles, and the valves.

15. Insufficient information is available to assess the structural analyses. A more complete assessment requires description of the key parameters used in the analyses such as damping, lumped mass spacing, details of support models, and the integration time step. The submittal infers that only the net unbalanced forces for the ITCHVALVE elements were used as input to the structural analysis. A discussion should be provided that describes how the axial extension from the balancing forces on each end of the elements was treated. Computer printouts of input and output for the limiting transient should be provided.

16. The submittal does not discuss how the safety valve bonnet assemblies and the relief valve actuators were modeled. They should be modeled as masses displaced from the pipe centerline and if the natural frequency of the bonnets or actuators could potentially be excited by piping or support motion then elements connecting the masses to the pipe should represent the flexibility of these structures. A discussion of the modeling of these items should be included. Also, the statement made concerning modeling of the piping supports in the structural model is questionable. The submittal states that all supports with natural frequencies of 20 Hz or greater were modeled as rigid. A frequency this low, however, does not imply rigidity. Details as to how supports were actually modeled should be provided.

17. Solving the acceleration term of the momentum balance equation was used to develop a forcing function for the structural code. The experience of EG&G Idaho with this technique is that spurious data spikes will occur during water discharge transients if every computational time step is used. However, if a finite time step is used, the technique may not include the peak load. Additional discussion of the solution techniques should be provided which demonstrates the accuracy and applicability of results for water discharge transients.

18. The Design Earthquake (DE) and Double Design Earthquake (DDE) response spectra used in the analysis has been identified as preliminary. The results of the comparison between the preliminary and final response spectra should be documented and if necessary, a revised report demonstrating the adequacy of the as-built pressurizer safety and relief valve piping should be submitted.

19. The method of handling the valve opening while the loop seal water is being passed through the valve and the valve popping open after the water discharge was not discussed. Additional information should be provided discussing the technique used and to demonstrate that the technique is conservative.

20. Was the piping upstream of the safety valves analyzed as a Class 1 system?