



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 108 TO FACILITY OPERATING LICENSE NO. DPR-80  
AND AMENDMENT NO. 107 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 September 30, 1995, Pacific Gas and Electric Company (the licensee) requested changes to the Technical Specifications (Appendix A to Facility Operating License Nos. DPR-80 and DPR-82) for the Diablo Canyon Nuclear Power Plant, Units 1 and 2 on an emergency basis. The proposed changes would revise Table 3.7-2 of Technical Specification (TS) 3.7.1.1 and the associated Bases to increase the setpoint tolerance of the main steam safety valves (MSSVs) from  $\pm 1$  percent to  $\pm 3$  percent, with the exception that the lowest-set MSSVs would have a tolerance of -2 percent/+3 percent. The proposed amendment would allow Diablo Canyon Unit 2 to restart following an unanticipated shutdown on September 23, 1995.

The safety evaluation for a license amendment request (LAR) to increase the setpoint tolerance for the MSSVs was initiated several years ago by the licensee in recognition of generic industry MSSV setpoint concerns. Prior to submitting this emergency license amendment request, the licensee was in the process of submitting the safety evaluation as part of an LAR to revise the MSSV setpoint tolerance. However, as a result of recent (September 12 to September 29, 1995) extensive MSSV testing, the licensee has determined that the MSSVs have a setpoint lift distribution specific to each valve. In addition, the licensee determined that the distribution for a specific valve may exceed  $\pm 1$  percent.

2.0 DISCUSSION AND EVALUATION

Overpressure protection of the main steam system is provided by five MSSVs located on each of the four main steam lines. There are a total of 20 MSSVs on each unit, set at staggered setpoints (1065, 1078, 1090, 1103 and 1115 psig), with sufficient capacity to limit secondary system pressures to less than 110 percent of the system design pressure.

The plant inservice testing (IST) program for the MSSVs currently meets the requirements of the 1977 Edition through 1978 Addenda of Section XI of the American Society of Mechanical Engineers (ASME) Code which does not specify a tolerance to be applied to the MSSV setpoint test results. The current TS 3.7.1.1 tolerance of  $\pm 1$  percent has been used as the acceptance criterion for ASME Code Section XI testing. Section XI requires a portion of the valves be tested each operating cycle with all being tested within five years and that additional MSSV testing be performed when a MSSV fails a setpoint test. This schedule will continue to be used except that the criterion for testing additional valves will be  $\pm 3$  percent ( $-2$ ,  $+3$  percent for the lowest-set MSSVs) of the nominal setpoint instead of  $\pm 1$  percent. However, all valves that are tested and found to be outside the  $\pm 1$  percent band will be reset to within  $\pm 1$  percent of the nominal setpoint. If a valve is found outside  $\pm 3$  percent ( $-2$ ,  $+3$  percent for the lowest-set MSSVs), corrective actions and a safety assessment will also be required. The licensee's proposed TS and IST criteria are consistent with the 1989 Edition of ASME Code Section XI, which allows the as-found setpoint to exceed the nominal value by up to 3 percent.

The licensee recently changed the onsite testing methodology to use the AVK "Ultra-Star" methodology which is a hydraulically-assisted method similar to the Trevitest method previously used, except that the lift point is determined by an acoustic sensor and the system pressure is determined by a pressure transducer. The licensee stated that the AVK method thereby minimizes the potential for human error. As a result of an array of testing performed on the plant MSSVs and extensive correlations between the licensee's test method and actual laboratory steam tests, the licensee has determined that the variance of the MSSV setpoints is greater than the current  $\pm 1$  percent TS tolerance. The licensee found that the expected variance for both their own testing methodology and laboratory steam testing is similar and is within approximately  $\pm 3$  percent using one standard deviation of the test result data. The licensee further determined that testing experience has shown that the initial lift can be expected to be at a slightly higher pressure than immediate subsequent lifts. The licensee has determined that there were several tests where the initial lifts exceeded the nominal setpoint by plus 3 percent after a period of power operation, but that for greater than 50 percent of the tests, the second lifts were within  $\pm 1$  percent of the nominal setpoints. The licensee postulates that once the initial bond of the valve disk to its seat is broken, the valve setpoint will revert to a value closer to its nominal value. As described below, there is sufficient conservatism in the system overpressure analyses such that if the initial MSSV lifts were slightly higher consistent with a greater amount of setpoint variance, the peak pressures would not exceed 110 percent of design pressure.

To support the proposed TS amendment for the change to the MSSV setpoint tolerances, the licensee has performed an evaluation and analyses to determine the impact on the design basis transients and accidents for Diablo Canyon Nuclear Power Plant, Units 1 and 2. All of the transients and accidents documented in the Updated FSAR were evaluated by the licensee to determine the

impact of the proposed change to the TS. For the cases where the TS change had an adverse impact on the event consequences, a detailed evaluation or reanalysis of the event has been performed.

The licensee used the RETRAN computer code to perform its reanalyses of the MSSV setpoint tolerance change. A description of the licensee's RETRAN model and a comparison of its calculated values with plant transient data and Updated FSAR data for a turbine trip were submitted along with the TS change request. The data comparison indicates that the RETRAN calculation overpredicts the peak system pressures during the most limiting heatup transients. The assumptions used in the RETRAN code are essentially the same as those used in the Updated FSAR. Based on the staff's review of the licensee's submittal, the staff believes that the use of the licensee's RETRAN computer code could reasonably estimate the peak transient system pressures and could, therefore, be used to perform an assessment for the impact of the TS change regarding MSSV setpoint tolerances.

The licensee has identified the loss of external electrical load/turbine trip as the limiting transient regarding peak primary and secondary system pressures. The licensee has reanalyzed cases for this transient with and without pressurizer pressure control. The results of its analysis indicate that the most limiting peak primary pressure of 2743 psia occurs in the case without pressurizer pressure control and the most limiting peak secondary system pressure of 1183 psia occurs in the case with pressurizer pressure control. In both cases, the peak transient primary and secondary system pressures are within 110 percent of the system design pressures and thus the results are acceptable to the staff. The licensee's evaluation concluded that the impact of the proposed TS change on all other heatup transients and accidents are bounded by the consequences of the turbine trip transient. Based on its review of the licensee's submittal, the staff agrees with the licensee's evaluation.

The licensee has evaluated the effects of the TS<sub>2</sub> change to a small break loss-of-coolant accident (LOCA) and determined that a penalty of 117 degrees F will be added to the FSAR documented peak clad temperature (PCT) of 1246 degrees F and, therefore, based on an upper limit of 2200°F, sufficient safety margin still exists. The licensee also evaluated the consequences of a steam generator tube rupture event and concluded that the change to the MSSV setpoint tolerance would not have a significant effect on the radiological consequences. This is because the majority of the steam will be released from the atmospheric steam dump valves, which are operated at lower pressures.

The staff has reviewed the results of the licensee's assessment and agrees with its conclusion. Therefore, the staff finds the proposed change to the MSSV setpoint tolerance acceptable. However, the staff is concerned regarding the variability and magnitude of some of the MSSV lifts identified during initial testing. Based on a teleconference with the licensee on October 1, 1995, the licensee committed to perform augmented inspection and testing on the MSSVs on a more frequent basis than that required by the ASME Code for at

least one operating cycle. Additional information on the details of the inspection and testing program will be provided to the staff by November 1, 1995.

### 3.0 EMERGENCY CIRCUMSTANCES

On September 14, 1995, MSSV testing was completed in preparation for the Unit 1 refueling outage. The as-found lift setpoints for 19 of 20 Unit 1 MSSVs were determined to be outside the TS 3.7.1.1 allowable setpoint tolerance of  $\pm 1$  percent. Of these 19 valves, 16 lifted between 3 percent and 9 percent above their nominal setpoints. The valves were returned to within  $\pm 1$  percent as required by the TS.

In response to the Unit 1 MSSV test results, testing of the Unit 2 MSSVs was initiated on September 21, 1995. Prior to completing the testing, a Unit 2 manual reactor trip occurred on September 23, 1995. Of the 16 valves tested prior to the event, 11 lifted greater than 1 percent above their setpoint, five lifted greater than 3 percent above their setpoint, and one lifted greater than 3 percent below its setpoint.

During the Unit 2 trip, two of the lowest-set MSSVs lifted when condenser vacuum was lost. These valves, which were 1065 psig setpoint valves, lifted at approximately 1028 and 1023 psig. Later in the event, a third 1065 psig setpoint valve lifted at approximately 1047 psig, and investigation is continuing into the possible lift of another MSSV.

Following evaluation of the Unit 2 MSSV test and trip results, the licensee undertook an extensive MSSV testing program, including the testing of all 20 MSSVs, to further evaluate this information. Test data indicates that each of the 20 MSSVs has a lift distribution or "signature" that should be established before adjustments of the setpoints are made. The valve signatures indicated that, based on a statistical distribution, not all of the valves are capable of lifting within  $\pm 1$  percent of their setpoint.,,

This situation was unavoidable and could not be anticipated because a more comprehensive understanding of the overall setpoint variability was only possible following the extensive testing recently performed on the Units 1 and 2 MSSVs. Accordingly, pursuant to 10 CFR 50.91(a)(5), the staff has determined that there are emergency circumstances warranting prompt approval of the proposed change in that failure to act in a timely way will prevent startup of Unit 2.

### 4.0 FINAL NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

The Commission's regulations in 10 CFR 50.92 state that the Commission may make a final determination that a license amendment involves no significant hazards considerations, if operation of the facility, in accordance with the amendment would not:

- (1) Involve a significant increase in the probability or consequences of any accident previously evaluated; or

- (2) Create the possibility of a new or different kind of accident from any accident previously evaluated; or
- (3) Involve a significant reduction in a margin of safety.

This amendment has been evaluated against the standards in 10 CFR 50.92. It does not involve a significant hazards consideration because:

- (i) Analyses demonstrate that the main steam safety valves (MSSVs) with the revised setpoint tolerances will continue to mitigate transients by preventing overpressurization of the reactor coolant system and the main steam system.

In addition, the proposed setpoint revision continues to provide assurance that the steam generator (SG) will not overflow during a SG tube rupture (SGTR) if the lowest set MSSV lifts at the low end of its tolerance band.

- (2) There is no physical alteration to any plant system, nor is there a change in the method in which any safety related system performs its function. Any main steam safety valve lifting at the extremes of the proposed tolerance will not result in a low lift setpoint that is less than the normal "no load" system pressure, or a high lift setpoint that allows main steam system overpressurization. Even if all of the MSSVs are at the high end of their tolerance band, overpressurization is precluded.
- (3) With the increased MSSV setpoint tolerances, the main steam line safety valves will still prevent pressure from exceeding 110 percent of design pressure in accordance with the ASME code. The conclusions of the FSAR Update accident analyses are unaffected by the change and remain valid.

Accordingly, the Commission has determined that this amendment involves no significant hazards considerations.

#### 5.0 STATE CONSULTATION

In accordance with the Commission's regulations, an attempt was made to notify the California State official of the proposed issuance of the amendment. The State official was not available. The State official will be contacted during the week of October 2, 1995.

#### 6.0 ENVIRONMENTAL CONSIDERATION

The amendment changes 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 amendment involves 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 made a final no significant hazards consideration

finding with respect to this amendment. Accordingly, the amendment meets 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 amendment.

#### 7.0 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 amendment will not be inimical to the common defense and security or to the health and safety of the public.

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Date: October 1, 1995