ENCLOSURE

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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| In the Matter of<br><br>PACIFIC GAS AND ELECTRIC COMPANY<br><br>Diablo Canyon Power Plant<br>Units 1 and 2 | Docket No. 50-275<br>Facility Operating License<br>No. DPR-80<br><br>Docket No. 50-323<br>Facility Operating License<br>No. DPR-82<br><br>License Amendment Request<br>No. 90-15 |

Pursuant to 10 CFR 50.90, Pacific Gas and Electric Company (PG&E) hereby applies to amend its Diablo Canyon Power Plant (DCPP) Facility Operating License Nos. DPR-80 and DPR-82 (Licenses).

The proposed changes amend the Technical Specifications (Appendix A of the Licenses) in regards to Technical Specifications 2.1, 3/4.2.3, and their associated Bases. Information on the proposed changes is provided in Attachments A and B.

These changes have been reviewed and are considered not to involve a significant hazards consideration as defined in 10 CFR 50.92 or require an environmental assessment in accordance with 10 CFR 51.22(b). Further, there is reasonable assurance that the health and safety of the public will not be endangered by the proposed changes.

Subscribed to in San Francisco, California this 21st day of December 1990.

Respectfully submitted,

Pacific Gas and Electric Company

By _____
J. D. Shiffer
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By _____
Richard F. Locke

Subscribed and sworn to before me
this 21st day of December 1990

_____
Adriane D. Tolefree, Notary Public
for the County of Alameda,
State of California
My commission expires December 22, 1992.

5146S/0085K

OFFICIAL SEAL
ADRIANE D. TOLEFREE
NOTARY PUBLIC - CALIFORNIA
ALAMEDA COUNTY
My Comm. Expires Dec. 22, 1992

Attachment A

REVISION OF TECHNICAL SPECIFICATIONS 2.1 AND 3/4.2.3
IMPLEMENTATION OF POWER-DEPENDENT RCS FLOW RATE LIMITS

A. DESCRIPTION OF AMENDMENT REQUEST

This License Amendment Request (LAR) would revise Technical Specification (TS) 2.1, "Safety Limits", and TS 3/4.2.3, "RCS Flow Rate and Nuclear Enthalpy Rise Hot Channel Factor", and their associated Bases, to implement power-dependent Reactor Coolant System (RCS) flow rate limits.

The proposed changes to TS 2.1 are as follows:

1. A note regarding operation in the expanded regions of proposed Figures 3.2-3a and 3.2-3b would be added to Figure 2.1-1a, "Reactor Core Safety Limit (Units 1 and 2 Cycle 4 and After)". TS 2.1 requires that the combination of percent RTP, pressurizer pressure and highest loop Tavg not exceed the limits show in Figure 2.1-1a. The margin between actual plant conditions and the appropriate safety limit curve is the margin existing to either the safety analysis Departure from Nucleate Boiling Ratio (DNBR) limit or saturation conditions at the reactor vessel exit. The DNBR limits are based upon a Nuclear Enthalpy Rise Hot Channel Factor equal to the 100 percent RTP TS limit and an RCS flow rate equal to the TS minimum acceptable value. The note would require using 100 percent RTP to determine margin if operation in the expanded regions were to become necessary. Using 100 percent RTP when power is restricted to less than 100 percent RTP would account for any downward shifting of the safety limit curves resulting from operation at reduced RCS flow rates. Proposed TS Figures 3.2-3a and 3.3-3b would also contain an appropriate note referencing the safety limit figure.

2. The TS references to "Units 1 and 2 Cycle 4 and after" and "Unit 2 Cycle 3" would be deleted since these dependencies are no longer required.

3. Figure 2.1-1b, "Reactor Core Safety Limit (Unit 2 Cycle 3)", would be deleted since this figure is no longer required. Figure 2.1-1a would become Figure 2.1-1 as a result of this deletion.

4. The TS Bases would be revised to delete references to "Unit 2 Cycle 3" and "Cycle 4 and after", since these dependencies are no longer required.

The proposed changes to TS 3/4.2.3 are as follows:

1. The acceptable operation regions of Figures 3.2-3a and 3.2-3c, "RCS Total Flow Rate Versus R", would be expanded to require a 2 percent Rated Thermal Power (RTP) reduction for a 1 percent reduction in RCS flow rate. This tradeoff between percent RTP and flow could be applied to flow rate reductions of up to 5 percent, corresponding to a limitation on power of 90 percent RTP.

2. The Unit 2 Cycle 3 TS requirements and the TS references to "Cycle 4 and after," would be deleted since these dependencies are no longer required.

3. Figure 3.2-3b, "RCS Flow Rate Versus R (Unit 2 Cycle 3)", would be deleted since this figure is no longer required. Figure 3.2-3c would become Figure 3.2-3b as a result of this deletion.

4. The TS Bases would be revised to reflect the power-dependent RCS flow rate limits and to delete references to "Unit 2 Cycle 3" and "Cycle 4 and after", since these dependencies are no longer required.

Changes to the TS are noted in the marked-up copy of the applicable TS (Attachment B).

B. BACKGROUND

TS 3/4.2.3 requires an RCS flow rate measurement every 18 months. Diablo Canyon Power Plant (DCPP) Surveillance Test Procedure (STP) R-26, "RCS Primary Coolant Flow Measurements", is used to perform this requirement. The flow rate is not directly measured, but is calculated based upon the gross steam generator thermal output from a plant heat balance and the measurement of hot and cold leg temperatures, Thot and Tcold.

The most recent TS-required flow rate measurement was performed on Unit 2 in May 1990 during power ascension testing. At 70 percent RTP, the result was only slightly above the minimum acceptable value of 362,500 gpm. However, the loop flow transmitter differential pressures (d/ps) showed no flow degradation had actually occurred. Westinghouse has attributed this lower calculated RCS flow rate to thermal stratification in the hot legs.

Hot leg stratification elevates the measured Thot above the actual Thot and is a result of incomplete mixing between the colder exit flow of the peripheral assemblies and the hotter exit flow of the inner assemblies. The placement of the hot leg RTD sample scoops is such that the full temperature effect of the colder water is not sensed and thus the hot leg temperature measurement is elevated. Since the calculated RCS flow rate is inversely proportional to the delta-T, the calculated flow rate is reduced.

Westinghouse indicates that hot leg stratification has been observed on many Westinghouse PWRs. It has also been observed on DCPP Unit 1, but to a lesser extent than on Unit 2. The Unit 2 beginning of cycle calculated RCS flow rates have decreased each cycle, from a first cycle value of 381,325 gpm at full power, to a fourth cycle value of 367,410 gpm at full power. The lower calculated flow rates have accompanied the installation of lower leakage reactor core designs as well as the removal of fuel assembly thimble plugs and the transition to a VANTAGE 5-fueled reactor core.

Based upon the information currently available on hot leg stratification, Westinghouse has concluded there are no safety issues raised by the reduction in calculated RCS flow rate. This conclusion is based upon the following:

1. The delta-T (Thot - Tcold) inputs to the protection system are rescaled to the full power, loop-specific delta-Ts determined at the beginning of each fuel cycle. This rescaling ensures the loop delta-Ts will be a diverse, accurate reactor power measurement.

2. Plant control systems are still controlling measured Tavg to the programmed reference value and actual Tavg is less than measured Tavg.

3. Loop flow elbow tap d/ps indicate that actual RCS flow rates did not change.

In a meeting held with the NRC on September 11, 1990, Westinghouse indicated they would continue to evaluate and keep the NRC informed on the hot leg stratification issue. Additionally, it is anticipated that PG&E and other utility members will work within the Westinghouse Owners Group to gain a better understanding of hot leg stratification and its effects.

C. JUSTIFICATION

TS 3/4.2.3 requires power reduction to less than 50 percent RTP when the measured RCS flow rate falls below the acceptable operation regions of TS Figures 3.2-3a and 3.2-3c for Units 1 and 2, respectively. A further reduction to less than 5 percent RTP is required if the flow rate is not restored within 24 hours. The expanded acceptable operation regions of proposed Figures 3.2-3a and 3.2-3b would prevent plant unavailability by providing flexibility in meeting the TS requirements on measured RCS flow rate. Similar changes to implement power-dependent RCS flow rate limits have been previously licensed at several other plants, including Sequoyah, V.C. Summer, McGuire, and Catawba.

The note added to Figure 2.1-1 would ensure margin to a specific safety limit curve could be determined if operation in the expanded regions of proposed Figures 3.2-3a and 3.2-3b became necessary.

The proposed changes to delete the Unit 2 Cycle 3 requirements, Bases, and figures, and references to "Cycle 4 and after" will simplify TS 3/4.2.3 and TS 2.1. These items are no longer applicable, since both units are in their fourth cycle. The deletion of nonapplicable requirements, Bases, figures, and references is an administrative change and is considered a human factors improvement.

D. SAFETY EVALUATION

A Safety Evaluation has been performed to determine the impact of the reduced flow, reduced power conditions proposed by this TS change. From this evaluation, it was concluded the implementation of power-dependent RCS flow rate limits would not adversely affect any of the following DCPP safety analyses:

1. Non-LOCA analyses.

2. LOCA and LOCA related accidents, including large and small break LOCAs, LOCA hydraulic forces, post-LOCA long term cooling, and hot leg switchover time.

3. Steam Generator Tube Rupture (SGTR) and radiological dose evaluation.

4. Containment response.

5. Mechanical equipment performance.

The results of the Safety Evaluation are summarized below.

Non-LOCA Analyses

It was concluded that the present steady state margin to DNB would be maintained by reducing RTP by 0.6 percent for a 1 percent reduction in RCS flow rate. Therefore, the proposed 2 percent RTP reduction for a 1 percent reduction in RCS flow rate is conservative for steady state operation.

All non-LOCA safety analyses were reviewed for the impact of the proposed TS change on the current DNB margins. Calculations were performed to determine the adequacy of the current Overtemperature Delta-T (OTDT) and Overpower Delta-T (OPDT) trip setpoints to protect the core under the proposed, reduced flow/reduced power conditions. These calculations confirmed the current setpoints will continue to provide core protection. However, the OTDT and OPDT setpoints would be reduced if operation within the expanded regions of TS Figures 3.2-3a and 3.2-3b became necessary. The setpoint reduction would be accomplished by rescaling the trip setpoint reference delta-Ts to the reduced flow/reduced power values. This will ensure the minimum DNBRs in the present non-LOCA analyses remain the limiting values. The requirement to rescale the trip setpoint reference delta-Ts to the reduced flow/reduced power values will be incorporated into STP R-26, "RCS Primary Coolant Flow Measurements".

LOCA-related Analyses

It was concluded that the present Small Break and Large Break Analyses continue to be bounding. This is based upon the beneficial effects of lower core power and lower actual Tavg on fuel temperature. In addition, the reactor vessel temperature rise for the 95 percent flow, 90 percent RTP case is less than the 100 percent RTP temperature rise.

The proposed power-dependent RCS flow rate limits do not affect the following LOCA-related analyses or results:

1. Blowdown reactor vessel and loop forcing functions.

2. Post-LOCA long-term cooling subcriticality requirement.

3. Post-LOCA long term cooling minimum flow requirement.

Hot Leg Switchover Time

It was concluded that the proposed power-dependent RCS flow TS will not adversely affect the hot leg switchover analysis. The reduced operating temperature increases reactor coolant mass. The reactor coolant mass is a diluting factor when determining the overall boron concentration of the cooling water to the core following a LOCA. Further, operating at a reduced power will lower core decay heat and subsequent rate of mass

boil-off. Thus, both the power reduction and the lower operating temperature will extend the switchover time.

SGTR Analysis

It was concluded that the results of the SGTR Analysis would be unaffected by the proposed TS change. This is based on the insensitivity of this analysis to slight reductions in RCS flow rate and the analysis assumption of a 100 percent RTP initial condition. Thus there is no adverse effect on the SGTR analysis or the radiation dose analyses for the SGTR event.

Summary of Containment Integrity Analysis

It was concluded that the results of the containment integrity analysis would be unaffected by the proposed TS change. The reduction in power and RCS flow rate has no direct effect on the mass and energy released to containment following a LOCA or main steam line break. However, the corresponding reduction in RCS temperature increases the mass release and decreases the energy release to containment.

The reduction in RCS temperature has no adverse effect on the short term mass and energy releases during a LOCA. The temperatures used in the short term analysis are lower than those for the reduced power/flow operating condition.

Following a LOCA, the reduced RCS temperature will increase the calculated long term mass release to the containment by approximately 0.5 percent, but will decrease the energy release by approximately 0.2 percent. These changes were considered to be insignificant and thus there would be no changes to the calculated mass and energy releases to the containment following a LOCA.

The containment response following a main steam line break is not affected by the proposed TS change because the mass and energy releases are not affected.

Mechanical Equipment Performance

It was concluded that the proposed reduced power/flow conditions would have no impact on the analysis of any RCS components. There would be no impact because a full power condition represents the limiting initial condition for the analysis of these components.

The increased steam pressure resulting from a reduced power condition would decrease the primary-to-secondary differential pressure. The decreased differential pressure would increase the stability of the steam generator tube bundle. Increased tube bundle stability would be beneficial in limiting failure mechanisms, such as vibration-induced tube fatigue in the U-bends. Therefore, the proposed TS change would not have an adverse effect on the steam generator pressure boundary.

Conclusions

Based upon the Safety Evaluation summarized above, the power-dependent RCS

flow rate limits of proposed TS Figures 3.2-3a and 3.2-3b would not adversely impact plant safety. The note added to TS Figure 2.2-1 would ensure margin to a specific safety limit curve could be correctly determined if operation in the expanded regions of Figures 3.2-3a and 3.2-3b became necessary. This is a conservative method to account for any downward shifting in the safety limit curves, since it was concluded from the safety evaluation that a 2 percent RTP reduction for a 1 percent reduction in RCS flow rate is conservative for steady state operation. The proposed changes to delete the Unit 2, Cycle 3 requirements, Bases, and figures, and to delete references to "Cycle 4 and after" will simplify TS 3/4.2.3 and 2.1. The deletion of nonapplicable TS requirements, Bases, figures, and references is an administrative change and is considered a human factors improvement.

In conclusion, PG&E believes there is reasonable assurance the health and safety of the public will not be adversely affected by the proposed TS changes.

E. NO SIGNIFICANT HAZARDS

PG&E has evaluated the no significant hazards considerations involved with the proposed amendment, focusing on the three standards set forth in 10 CFR 50.92(c) as quoted below:

> The Commission may make a final determination, pursuant to the procedures in paragraph 50.91, that a proposed amendment to an operating license for a facility licensed under paragraph 50.21(b) or paragraph 50.22 or a testing facility involves no significant hazards consideration, if operation of the facility in accordance with the proposed amendment would not:
>
> (1) Involve a significant increase in the probability or consequences of an 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.

The following evaluation is provided for the no significant hazards consideration.

1. Does the change involve a significant increase in the probability or consequences of an accident previously evaluated?

   The proposed change to implement power-dependent RCS flow rate limits does not change any of the FSAR Update results. The minimum DNBRs calculated in the present non-LOCA analyses remain the limiting values. The present small break and large break analyses continue to be bounding. The consequences of an accident previously analyzed are not increased because the inputs to the radiological dose calculations are not affected.

   The proposed change to add a note to TS Figure 2.2-1 is a conservative method to account for any downward shifting in the safety limit

curves, since the safety evaluation concluded that a 2 percent RTP reduction for a 1 percent reduction in RCS flow rate is conservative for steady state operation.

The proposed changes to delete the Unit 2, Cycle 3 requirements, Bases, and figures, and to delete references to "Cycle 4 and after" will simplify TS 3/4.2.3 and 2.1. These changes are administrative and are considered a human factors improvement.

Therefore, the proposed changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the change create the possibility of a new or different kind of accident from any accident previously evaluated?

   The proposed changes to implement power-dependent RCS flow rate limits and to add a note to TS Figure 2.2-1 do not require physical alteration to any plant system nor do they change the method by which any safety-related system performs its functions.

   The proposed administrative changes to delete the Unit 2, Cycle 3 requirements and figures, and to delete references to "Cycle 4 and after" will simplify TS 3/4.2.3 and 2.1. These changes are administrative and are considered a human factors improvement.

   Therefore, the proposed changes do not create the possibility of a new or different kind of accident from any accident previously analyzed.

3. Does the change involve a significant reduction in a margin of safety?

   The proposed change to implement power-dependent RCS flow rate limits does not change any of the FSAR Update accident analyses initial conditions or results. The minimum DNBRs calculated in the present non-LOCA analyses remain the limiting values. The present small break and large break analyses continue to be bounding. The consequences of an accident previously analyzed are not increased because the inputs to the radiological dose calculations are not affected.

   The proposed change to add a note to TS Figure 2.2-1 is a conservative method to account for any downward shifting in the safety limit curves, since the safety evaluation concluded that a 2 percent RTP reduction for a 1 percent reduction in RCS flow rate is conservative for steady state operation.

   The proposed changes to delete the Unit 2, Cycle 3 requirements, Bases, and figures, and to delete references to "Cycle 4 and after" will simplify TS 3/4.2.3 and 2.1. These changes are administrative and are considered a human factors improvement.

   Therefore, the proposed changes do not involve a significant reduction in a margin of safety.

F. NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

Based on the above safety evaluation, PG&E concludes that the activities associated with this LAR satisfy the no significant hazards consideration standards of 10 CFR 50.92(c) and, accordingly, a no significant hazards consideration finding is justified.

G. ENVIRONMENTAL EVALUATION

PG&E has evaluated the proposed change and determined the change does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed change meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), an environmental assessment of the proposed change is not required.