ENCLOSURE

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of)	Docket No. 50-275
)	Facility Operating License
PACIFIC GAS AND ELECTRIC COMPANY)	No. DPR-80
)	
Diablo Canyon Power Plant)	Docket No. 50-323
Units 1 and 2)	Facility Operating License
)	No. DPR-82

License Amendment Request
No. 88-02

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.

The proposed change amends the Units 1 and 2 Technical Specifications (Appendix A of the Licenses) regarding Technical Specification 3/4.3.4 and associated Bases.

Information on the proposed change is provided in Attachments A and B.

This change has been reviewed and is considered not to involve a significant hazards consideration as defined in 10 CFR 50.92 or an unreviewed environmental question. Further, there is reasonable assurance that the health and safety of the public will not be endangered by the proposed change.

Subscribed in San Francisco, California, this 22nd day of January 1988.

Respectfully submitted,

Pacific Gas and Electric Company

By _____
J. D. Shiffer
Vice President
Nuclear Power Generation

Howard V. Golub
Richard F. Locke
Attorneys for Pacific
Gas and Electric Company

By _____
Richard F. Locke

Subscribed and sworn to before me
this 22nd day of January 1988.

_____
Nancy J. Lemaster, Notary Public in
and for the City and County of
San Francisco, State of California
My commission expires April 2, 1990

NANCY J. LEMASTER
NOTARY PUBLIC - CALIFORNIA
CITY & COUNTY OF SAN FRANCISCO
My Commission Expires April 27, 1990

SEA

1873S/0053K

ATTACHMENT A

REVISION OF TECHNICAL SPECIFICATION 3/4.3.4 AND ASSOCIATED BASES REGARDING TURBINE VALVE SURVEILLANCE TEST FREQUENCY

A. DESCRIPTION OF AMENDMENT REQUEST

This license amendment request (LAR) proposes to amend Technical Specification 3/4.3.4, "Turbine Overspeed Protection," to (1) change the frequency of the main turbine valves stroke testing from weekly to quarterly and (2) change the frequency for the direct observation of valve movement from every 31 days to quarterly. This LAR also proposes to delete the footnote to Technical Specification 3/4.3.4, and to add the basis for the surveillance test frequency to Bases 3/4.3.4.

The change to the Technical Specifications of Operating License Nos. DPR-80 and DPR-82 is noted in the marked-up copy of the Technical Specification (Attachment B).

B. BACKGROUND

1. Turbine Valve Testing Basis

Historically, Westinghouse has recommended that turbine valves be tested at periodic intervals. The current surveillance testing requirements in Technical Specification 3/4.3.4 were derived from the Westinghouse recommended test interval, which was developed for fossil units and carried over to nuclear units because of the similarity of turbine design. However, fossil units produced steam with much greater particulate content (impurities) than is permitted in nuclear units. Because of these impurities, more frequent valve surveillance was recommended to ensure reliable operation. With improved valve design and an increase in industry knowledge concerning turbine valve reliability, the original reasons for frequent valve testing no longer apply. Nonetheless, frequent valve testing has remained a requirement even though its necessity has not been shown.

The turbine valves control and protect the main turbine. They must be capable of moving freely in response to control and protection signals. Testing is conducted to verify that equipment is capable of performing its intended function. Testing can identify:

- Equipment failure - the complete nonperformance of equipment function
- Equipment failure precursors - equipment conditions that will eventually lead to failure if not corrected

PG&E originally committed to weekly testing of the turbine control valves in accordance with Westinghouse recommendations (letter from P.A. Crane, PG&E, to J.P. Stoltz, NRC, dated April 11, 1978). As a result of discussions with the NRC Staff regarding valve reliability and turbine missile risks, the weekly testing frequency was subsequently evaluated and satisfactorily resolved by

the NRC as described in Section 3.5 of SSERs 7 and 8, dated May 26, 1978, and November 14, 1978, respectively. Turbine overspeed issues for Diablo Canyon, primarily in relation to destructive analysis and valve qualification, were also addressed in the ACRS meetings of January 19, 1984, and February 10, 1984. A probabilistic evaluation of the importance of the frequency of turbine valve testing in order to assure turbine overspeed protection system operability was undertaken as described below in Section B.4. The results of that evaluation provide the basis for this request.

2. Description of Turbine Control and Overspeed Protection System

Diablo Canyon utilizes a digital electrohydraulic (DEH) control system to control turbine valve positioning. Stop and control valves regulate steam flow to the high-pressure turbine, and the intercept and reheat stop valves regulate steam flow to the low-pressure turbines. All of these valves close automatically in response to the dumping of DEH fluid, which occurs in response to an overspeed trip or other turbine trip signal.

In normal operation, each stop valve is held open against a closing spring force by high-pressure fluid acting on the actuator piston. Each stop valve has a dump valve that opens if the DEH fluid pressure is dumped. When the dump valve opens, the high-pressure fluid drains, allowing the spring force to rapidly close the stop valve.

Control (governor) valves adjust the inflow of steam to the turbine in response to the speed or load demand placed on the turbine-generator. Each has a servo valve and a dump valve. The servo valve receives an electrical input from the electronic controller and positions the steam valve through the control of high-pressure fluid to the actuator. The electronic controller is a digital processor receiving turbine speed, generator megawatt output, and first stage pressure feedbacks. The control (governor) valve moves rapidly to the fully closed position if the dump valve is opened by a trip or protective device that dumps the DEH fluid.

Intercept and reheat stop valves are held open by high-pressure fluid operating on the pistons of the actuators. Each intercept valve has a dump valve that is connected to a common control DEH fluid header. The dump valves open in response to a dump of the fluid and close the intercept valves. Reheat stop valves have dump valves that are connected to the common stop fluid header. Reheat stop valves close in response to a dump of the fluid.

The DEH control system regulates the flow of steam to the turbine and permits the selection of the desired turbine speed and acceleration rates. The control speed channel, generator megawatt output, and turbine impulse stage pressure are the primary feedbacks to the valve electronic controller that positions the control (governor) valves. If the turbine accelerates from its normal speed, the control speed channel feedback to the DEH control positions the servo valve on each control valve to rapidly reduce the fluid pressure acting on the control valve servo-actuators. This causes control valve closure until the turbine returns to normal speed.

Three additional protective devices are available at DCPP to prevent excessive overspeed. First, there is an overspeed protection controller from a separate speed channel which activates with loss of load or at an overspeed setpoint of approximately 103 percent of rated speed. This automatically opens solenoid valves that drain the control DEH fluid and cause the control valves and interceptor valves to close.

Second, there is a mechanical overspeed trip, which consists of an eccentric weight, trigger, and cup valve that will activate at an overspeed setpoint of approximately 111 percent of rated speed. This drains the autostop oil, which releases pressure on the diaphragm of the interface valve, which then opens and drains the DEH fluid, closing the control, stop, reheat intercept, and reheat stop valves.

Third, as a backup to the mechanical overspeed trip, if a speed corresponding to 111.5 percent of rated speed is sensed by the electronic overspeed protection speed sensing circuit, a solenoid valve is actuated on the autostop oil system which dumps DEH fluid, generating a turbine trip to close all the turbine steam inlet valves.

3. Reliability of Turbine Overspeed Protection System

The present Technical Specifications require demonstration of the turbine overspeed protection system operability by the following surveillances:

a. At least once per 7 days by cycling of specified valves at least one complete cycle from the running position.

b. At least once per 31 days by direct observation of the movement of the specified valves through one complete cycle from the running position.

c. At least once per 18 months by performing a channel calibration of the turbine overspeed protection systems.

d. At least once per 40 months by disassembling at least one of each of the specified valves; performing a visual and surface inspection of valve seats, disks, and stems; and verifying no unacceptable flaws or corrosion.

The operating experience of both units to date and the performance of these surveillances have disclosed no significant problems relating to the capability or function of the overspeed protection system.

The surveillance tests for item a. above have been performed over 125 times for Unit 1 and over 85 times for Unit 2, with no identified valve sticking or other equipment problems.

The surveillance test for item b. involves an individual observing the valves while performing item a. This has been performed at least 25 times on Unit 1 and at least 15 times on Unit 2 with no identified problems.

While this request does not affect requirements c. and d., no unacceptable results have been obtained during the performance of these surveillance tests

on either DCPP unit. Four valves (one of each type) were disassembled and inspected on Unit 1 in 1986; all eight high-pressure turbine inlet valves on Unit 2 were disassembled and inspected in 1987. No unfavorable observations were made with respect to valve closure functions.

4. Probabilistic Evaluation of Reduction in Turbine Valve Test Frequency (WCAP-11525)

The Westinghouse Owner's Group Turbine Valve Test Frequency Evaluation Subgroup was formed to determine an appropriate test frequency interval. The results of this evaluation are documented in WCAP-11525, "Probabilistic Evaluation of Reduction in Turbine Valve Test Frequency." WCAP-11525 was submitted to the NRC on the Prairie Island Units 1 and 2 docket. A request to extend the frequency for the valve surveillance testing is planned to be submitted on the Salem docket.

The evaluation consisted of fault tree construction with the top event providing the annual probability or frequency of turbine overspeed. Failures of turbine valves and overspeed protection components were modeled in the fault trees as a function of the valve test interval. Data from DCPP were used to quantify the fault trees with the probability of overspeed calculated for various test intervals. The evaluation also determined the probability of missile generation at an overspeed condition. The probability of overspeed and the probability of missile generation were combined to arrive at the total probability of missile generation considering various valve test intervals.

PRA results for Diablo Canyon indicate that the test frequency could be extended to greater than seven months and meet the NRC's reliability criteria for turbine systems given in a letter to Westinghouse Electric Corporation dated February 2, 1987 (C.E. Rossi, USNRC, to J.A. Martin, Westinghouse). Therefore, the currently required 7- and 31-day surveillance tests of the turbine valves are not necessary.

C. JUSTIFICATION

Turbine valve testing is currently performed on a weekly basis. Testing the turbine valves requires that the unit power level be reduced to 90 percent. This power reduction places unnecessary thermal and pressure cycles on equipment, which could result in a reduction of overall plant safety and reliability. In addition, inadvertent reactor trips are more likely during the power reduction and return to full power transients.

A quarterly test frequency was selected because a partial stroke of the main steam isolation valves is required by the ASME Section XI Pump and Valve Testing Program on a quarterly frequency. In order to perform the partial stroke test, the unit must be at less than 70 percent of rated power.

Deletion of the footnote is purely administrative, since it is no longer applicable.

D. SAFETY EVALUATION

The turbine overspeed protection system trips the turbine steam inlet valves in the event the turbine reaches or exceeds 111 percent of rated speed. The failure or unavailability of the turbine overspeed protection system affects or contributes to the probability that the turbine could overspeed and eject a missile. WCAP-11525 documents an evaluation of the need for periodic valve testing of the overspeed protection system and the need to establish appropriate test intervals to preclude this accident. The evaluation included construction of fault trees with the top event giving the annual probability or frequency of overspeed. Failures of turbine valves and overspeed protection components were modeled in the fault trees as a function of the valve test interval. DCPP data were used to quantify the fault trees. The probability of overspeed was calculated for various test intervals. The evaluation also determined the probability of a turbine missile event at an overspeed condition.

The probability of overspeed and the probability of a missile ejection were combined to arrive at the total probability of missile ejection, considering various valve test intervals. The evaluation in WCAP-11525 shows that the probability of a DCPP missile ejection event for turbine valve test intervals greater than seven months is less than the established NRC acceptance criteria provided in an NRC letter to Westinghouse, dated February 2, 1987 (C. E. Rossi, USNRC, to J. A. Martin, Westinghouse).

The results of WCAP-11525 show that increasing the DCPP turbine valve testing interval does not represent a significant increase in the probability of a turbine missile event.

A study of past surveillances conducted at the current seven-day interval shows that a turbine valve malfunction has never occurred in the history of plant operation. The nuclear plant secondary chemistry program, established to protect the steam generators, has contributed to better turbine valve performance. One of the most significant failure modes assumed in the current surveillance frequency was based on valve stem interference due to chemical buildup. Valve testing surveillance history shows that at DCPP, no observed valve binding has occurred that affects the tripping of these valves.

The proven reliability of the valve operability and the results of the probabilistic risk assessment provide reasonable assurance that the health and safety of the public will not be endangered by the change in frequency of valve testing.

The deletion of the footnote to Technical Specification 3/4.3.4 is purely administrative, since the footnote no longer applies. Therefore, deletion of the footnote will not affect the health and safety of the public.

E. NO SIGNIFICANT HAZARDS EVALUATION

PG&E has evaluated the hazard 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 considerations, 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 standards.

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

   As discussed in Section B.3, turbine valve test results and operating experience at DCPP have demonstrated the high reliability of the turbine overspeed protection system.

   WCAP-11525 provides an evaluation of the probability of turbine missile generation and the results justify a reduction in the frequency of the turbine valve testing. In a letter to Westinghouse Electric Corporation dated February 2, 1987 (C.E. Rossi, USNRC, to J.A. Martin, Westinghouse), the NRC Staff established acceptance criteria for the probability of turbine missile ejection. The evaluation in WCAP-11525 shows that the probability of a DCPP missile ejection event for turbine valve test intervals up to seven months is less than the established acceptance criteria. According to the results of WCAP-11525, the small change in the probability of turbine missile generation with longer turbine valve testing intervals does not represent a significant increase in the probability of a turbine missile event. Furthermore, the longer turbine valve testing interval has no effect on the consequences of a turbine missile event.

   The demonstrated reliability of the turbine valve system and the results of WCAP-11525 show that the proposed increase in the DCPP turbine valve testing interval does not represent a significant increase in the probability or consequences of an accident previously evaluated. Deletion of the footnote, which is no longer applicable, is purely administrative and does not represent 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 amendment does not change the kind, number, or type of overspeed protection components at DCPP. Also, decreasing the frequency of turbine valve testing does not result in a significant change in the failure rate or change the failure modes for the turbine valves. Deletion of the footnote to Technical Specification 3/4.3.4 is purely administrative.

Therefore, the proposed increase in the DCPP turbine valve testing interval and deletion of the footnote do not create the possibility of a new or different kind of accident from any accident previously evaluated.

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

As discussed in Section B.3, the DCPP turbine overspeed protection system has been demonstrated by testing to be highly reliable.

WCAP-11525 demonstrates that a substantial increase in the existing testing interval can be obtained without increasing turbine missile ejection probabilities above those acceptable to the NRC. Remaining within the established NRC acceptance criteria ensures that the probability of damaging safety-related components, equipment, or structures as a result of generation of a turbine missile does not exceed limits reported in the safety analysis.

The high reliability of the turbine valve system and the results of WCAP-11525 demonstrate that the proposed increase in the DCPP turbine valve testing interval does not involve a significant reduction in a margin of safety. Deletion of the footnote, which is no longer applicable, is purely administrative and does not result in a reduction in a margin of safety.

F. NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

From the above evaluation, PG&E concludes that the activities associated with this license amendment request 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 that 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(b), and an environmental assessment of the proposed changes is not required.

ATTACHMENT B

REVISED TECHNICAL SPECIFICATION 3/4.3.4
AND ASSOCIATED BASES

Remove	Insert
3/4 3-69	3/4 3-69
B 3/4 3-5	B 3/4 3-5