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SUBJECT: Application for amends to licenses DPR-80 & DPR-82,revising TSs 3/4.3.2 & 3/4.7.1.7.

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August 10, 1998

PG&E Letter DCL-98-109

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Docket No. 50-275, OL-DPR-80
Docket No. 50-323, OL-DPR-82
Diablo Canyon Units 1 and 2
License Amendment Request 98-05
Revision of Technical Specification 3/4.3.2, "Engineered Safety Features Actuation System Instrumentation," and Technical Specification 3/4.7.1.7, "Main Feedwater Regulating, Bypass, and Isolation Valves"

Dear Commissioners and Staff:

Enclosed is an application for amendment to Facility Operating License Nos. DPR-80 and DPR-82. This license amendment request (LAR) proposes to revise Technical Specification (TS) 3/4.3.2, Table 3.3-5, "Engineered Safety Features Response Times," to add response times for closure of the main feedwater regulating valves (MFRV) and associated bypass valves, and for trip of the main feedwater pumps (MFWP). Also, this LAR proposes to revise TS 3/4.7.1.7 to add a limiting condition for operation (LCO), actions, and surveillance requirements for the MFWP turbine stop valves, and revise the actions and surveillance requirements for the MFRVs, MFRV bypass valves, and main feedwater isolation valves (MFIVs) to be consistent with NUREG-1431, "Standard Technical Specifications - Westinghouse Plants, Revision 1, April 1995," requirements. PG&E has submitted LAR 97-09 (PG&E Letter DCL-97-106, "Technical Specification Conversion License Amendment Request," dated June 2, 1997) to convert the current TS to TS based on NUREG-1431. Changes proposed in LAR 97-09 applicable to TS 3/4.7.1.7 are included in this submittal.

In the event of excessive heat removal due to a feedwater system malfunction, an accidental depressurization of the main steam system, or major secondary system pipe rupture, feedwater flow to the steam generators is terminated by closure of the MFRVs, MFRV bypass valves, and MFIVs, and by the trip of the MFWPs. Although the closure times for the MFRVs and MFRV bypass valves are verified in TS 3/4.7.1.7, the addition of feedwater isolation response time

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requirements for the MFRVs and MFRV bypass valves will further ensure these components are operable and capable of performing their intended safety function. Also, addition of response time requirements for the MFWP trip, and the addition of an LCO, actions, and surveillance requirements for the MFWP turbine stop valves (MFWP trip function) will ensure that these components are operable and are capable of performing their intended safety function.

A description of the proposed TS changes, and the bases for them, are provided in Attachment A. Changes to the TS and associated Bases are noted in the marked-up copies of the current TS pages and proposed improved TS pages provided in Attachments B and D. Proposed current TS pages are provided in Attachment C. The changes do not involve a significant hazards consideration, as defined in 10 CFR 50.92, or an unreviewed environmental question. Further, there is reasonable assurance that the proposed changes will not adversely affect the health and safety of the public.

The changes proposed in this LAR are not required to address an immediate safety concern. PG&E requests that the NRC assign a medium priority for review and approval of this LAR.

PG&E also requests that the TS changes become effective immediately upon issuance of the license amendment, to be implemented within 30 days from the date of issuance.

Sincerely,

Gregory M. Rueger

cc: Edgar Bailey, DHS
Steven D. Bloom
Dennis F. Kirsch
Ellis W. Merschoff
David L. Proulx
Diablo Distribution

Enclosures

/tcg

Enclosure
PG&E Letter DCL-98-109

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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

AFFIDAVIT

Gregory M. Rueger, of lawful age, first being duly sworn upon oath says that he is Senior Vice President - Nuclear Power Generation of Pacific Gas and Electric Company; that he is familiar with the content thereof; that he has executed LAR 98-05 on behalf of said company with full power and authority to do so; and that the facts stated therein are true and correct to the best of his knowledge, information, and belief.

Gregory M. Rueger
Senior Vice President
Nuclear Power Generation

Subscribed and sworn to before me this 10 day of August, 1998.

Notary Public

AMY J. CALLOWAY
COMM. #1096602
NOTARY PUBLIC CALIFORNIA
SAN LUIS OBISPO COUNTY
My Comm. Expires April 28, 2000

REVISION OF TECHNICAL SPECIFICATION 3/4.3.2, "ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION," AND TECHNICAL SPECIFICATION 3/4.7.1.7, "MAIN FEEDWATER REGULATING, BYPASS, AND ISOLATION VALVES"

A. DESCRIPTION OF AMENDMENT REQUEST

This license amendment request (LAR) proposes to revise Technical Specification (TS) 3/4.3.2, Table 3.3-5, "Engineered Safety Features Response Times," to add the response times for closure of the main feedwater regulating valves (MFRVs) and MFRV bypass valves, and trip of the main feedwater pumps (MFWPs). This change also revises TS 3/4.7.1.7 to add a limiting condition for operation (LCO), actions, and surveillance requirements for the MFWP turbine stop valves, and revises the TS 3/4.7.1.7 actions and surveillance requirements for the MFRVs, MFRV bypass valves, and main feedwater isolation valves (MFIVs) to be consistent with the NUREG-1431 requirements.

The proposed changes to TS 3/4.3.2 are:

1. TS Table 3.3-5 would be revised by replacing the response time in seconds (either "≤ 63" or "≤ 66") with a note "(9)" for the following initiating signals and functions:

   2.a.2 Containment Pressure - High, Safety Injection (ECCS), Feedwater Isolation,

   3.a.2 Pressurizer Pressure - Low, Safety Injection (ECCS), Feedwater Isolation,

   6.a.2 Steam Line Pressure - Low, Safety Injection (ECCS), Feedwater Isolation, and

   8.b Steam Generator Water Level - High-High, Feedwater Isolation.

   The response times for feedwater isolation currently in TS Table 3.3-5 are for the MFIVs. The response time for feedwater isolation by closure of the MFIVs on a safety injection signal (SIS) is 63 seconds; for a steam generator (SG) water level - high-high signal the response time is 66 seconds.

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2. TS Table 3.3-5, TABLE NOTATIONS would be revised by adding note "(9)" stating that "Feedwater isolation includes closure of the main feedwater regulating valves (MFRVs), MFRV bypass valves, main feedwater isolation valves (MFIVs), and trip of the main feedwater pumps (MFWPs). The response time for feedwater isolation by closure of the MFRVs and MFRV bypass valves is 9 seconds. The response time for feedwater isolation by closure of the MFIVs is 63 seconds for a safety injection signal; and 66 seconds for a steam generator water level - high-high signal. The response time for feedwater isolation by trip of the MFWPs is 5 seconds (not including pump coastdown)."

   This change adds response time requirements for closure of the MFRVs and MFRV bypass valves, and for trip of the MFWPs.

The proposed changes to TS 3/4.7.1.7 are:

1. The TS title would be revised to read "MAIN FEEDWATER ISOLATION VALVES (MFIVs), MAIN FEEDWATER REGULATING VALVES (MFRVs), MFRV BYPASS VALVES, AND MAIN FEEDWATER PUMP (MFWP) TURBINE STOP VALVES."

2. TS 3.7.1.7 would be revised to read "Four MFIVs, four MFRVs , four MFRV bypass valves, and four MFWP turbine stop valves shall be OPERABLE." This revised LCO adds requirements for the MFWP turbine stop valves. The current TS requirement to have the valves closed or isolated if not operable is moved to the Applicability.

3. The Applicability would be revised to read "MODES 1, 2, and 3, except when MFIV, MFRV, or MFRV bypass valve is closed and de-activated or isolated by a closed manual valve; or when MFWP turbine stop valve is closed and steam supply to MFWP turbine is isolated, or MFWP discharge is isolated by a closed manual valve."

4. The Actions would be revised to read:

   "a. With one or more MFIVs inoperable, restore the inoperable MFIV to OPERABLE status or close or isolate the MFIV within 72 hours; verify the MFIV closed or isolated once per 7 days. Separate ACTION entry is allowed for each valve.

   b. With one or more MFRVs inoperable, restore the inoperable MFRV to OPERABLE status or close or isolate the MFRV within 72 hours; verify the MFRV closed or isolated once per 7 days. Separate ACTION entry is allowed for each valve.

c. With one or more MFRV bypass valves inoperable, restore the inoperable MFRV bypass valve to OPERABLE status or close or isolate the MFRV bypass valve within 72 hours; verify the MFRV bypass valve closed or isolated once per 7 days. Separate ACTION entry is allowed for each valve.

d. With one or more MFWP turbine stop valves inoperable, restore the inoperable MFWP turbine stop valve to OPERABLE status or close the MFWP turbine stop valve or trip the MFWP or isolate the MFWP discharge within 72 hours; verify the MFWP turbine stop valve closed, the MFWP tripped, or the MFWP discharge isolated once per 7 days. Separate ACTION entry is allowed for each valve.

e. With two valves inoperable resulting in a loss of feedwater isolation capability for a flow path, restore at least one valve to OPERABLE status or isolate the affected flow path within 8 hours.

f. Required ACTION requirements above not met, be in at least HOT STANDBY in 6 hours and in HOT SHUTDOWN within the following 6 hours."

The proposed changes would allow separate action entry for each valve, revise the current allowable outage time (AOT) for an inoperable MFIV, MFRV, or MFRV bypass valve from 4 hours to 72 hours, provide actions if a MFWP turbine stop valve is inoperable, and provide actions if more than one MFIV, MFRV or MFRV bypass valve, or MFWP turbine stop valve are inoperable resulting in a loss of feedwater isolation capability for a flow path.

5. Surveillance Requirement 4.7.1.7.3 would be added to require "Each MFWP turbine stop valve shall be demonstrated OPERABLE by determining the closure time of each valve to be less than or equal to 1 second (not including instrument delays) at least each COLD SHUTDOWN, but not more frequently than once per 92 days."

6. Surveillance Requirement 4.7.1.7.4 would be added to "Verify each MFIV, MFRV, MFRV bypass valve, and MFWP turbine stop valve actuates to the closed position on an actual or simulated actuation signal at least once every 24 months."

The associated TS Bases for TS 3/4.3.2 and TS 3/4.7.1.7 would also be appropriately revised.

Changes to the TS and associated Bases are noted in the marked-up copies of the current TS pages and proposed improved technical specification (ITS) pages, as provided in Attachments B and D, respectively. No changes are required to ITS Section 3.3. Proposed current TS pages are provided in Attachment C.

B. BACKGROUND

In the event of excessive heat removal due to a feedwater system malfunction, accidental depressurization of the main steam system (MSS), or a major secondary system pipe rupture, the solid state protection system (SSPS) initiates signals that automatically close the MFRVs, the MFRV bypass valves, and the MFIVs, and trip the MFWPs. Both SSPS actuation logic trains generate signals to close the MFRVs and the MFRV bypass valves. Closure of the MFIVs and trip of the MFWPs provide backup feedwater isolation if a MFRV or MFRV bypass valve fails to close. The MFIVs and MFWPs receive feedwater isolation signals from opposite SSPS actuation logic trains. The MFIVs close on a feedwater isolation signal from SSPS actuation logic Train A. The MFWPs trip on a feedwater isolation signal from SSPS actuation logic Train B. The MFWP trip is a Class II feature.

TS 3/4.3.2, Table 3.3-5 includes response time requirements for feedwater isolation by closure of the MFIVs. The MFIV response times are 63 seconds for a SIS, and 66 seconds for an SG water level - high-high signal (60 second valve closure time). Response time requirements for feedwater isolation by closure of the MFRVs and the MFRV bypass valves, and by trip of the MFWPs are not included in Table 3.3-5, but are included in plant procedures.

TS 3/4.7.1.7 includes LCOs, actions, and surveillance requirements for the MFRVs, the MFRV bypass valves, and the MFIVs. These requirements were added by License Amendments (LA) 77 and 76, issued March 18, 1993, for Units 1 and 2, respectively. The safety evaluation (SE) for LA 77 and 76 discusses the feedwater isolation function provided by the MFRVs, MFRV bypass valves, MFIVs, and the MFWP trip. However, LCOs, actions, and surveillance requirements for the MFWP turbine stop valves, which shut on a feedwater isolation signal to trip the MFWPs, are not included in the TS. Plant procedures currently verify the MFWP trip function by performance of the slave relay test of the MFWP trip which verifies operation of the MFWP trip, i.e., the MFWP turbine stop valves will close on receipt of a simulated feedwater isolation signal from the SSPS, and verify the MFWP turbine stop valve closure times.

A PG&E assessment of activities associated with MFWP turbine stop valve

closure and feedwater isolation, done as a follow-up to a Unit 2 trip in March 1997, questioned the lack of response time requirements for trip of the MFWPs in the TS. The trip of the MFWPs is credited for terminating feedwater flow for certain events in the event of failure of a MFRV or MFRV bypass valve. Administrative controls were established on May 26, 1997, to provide interim guidance for verification of the MFWP trip response time, and to provide assurance that the MFWPs trip as required.

PG&E submitted LAR 97-09 (PG&E Letter DCL-97-106, dated June 2, 1997) to convert the current TS to ITS based on NUREG-1431. Changes proposed in LAR 97-09 related to current TS 3/4.7.1.7 are included in this LAR.

C. JUSTIFICATION

TS 3/4.3.2, Table 3.3-5 includes response time requirements for the MFIVs for feedwater isolation. Response time requirements for the MFRVs and MFRV bypass valves, and for trip of the MFWP are not specified in Table 3.3-5. To ensure consistent application of response time requirements, the response times for feedwater isolation by closure of the MFRVs and MFRV bypass valves, and by trip of the MFWP should be added to TS 3/4.3.2, Table 3.3-5. This will provide controls to ensure that the feedwater isolation function is operable.

Additionally, since the trip of the MFWPs, along with closure of the MFIVs, is credited with providing feedwater isolation by terminating feedwater flow if a MFRV or MFRV bypass valve fails to close, the MFWP turbine stop valves should have controls consistent with those established for the MFRVs, MFRV bypass valves, and MFIVs in TS 3/4.7.1.7 to ensure operability of the valves to trip the MFWP and perform the feedwater isolation function. Requirements to verify closure times for the MFWP turbine stop valves and to verify that each MFWP turbine stop valve actuates to the closed position on an actual or simulated actuation signal would be included in TS 3/4.7.1.7.

The increase in the AOT for the MFRVs, MFRV bypass valves, and MFIVs from 4 hours to 72 hours, is consistent with NUREG-1431 and allows a more reasonable time to diagnose the problem, mobilize corrective actions, obtain administrative clearances, complete the maintenance, restore the valve to an operable condition, and where appropriate, perform a post-maintenance verification.

The addition of the action for two valves inoperable resulting in a loss of feedwater isolation capability for a flow path provides a period of time to correct the problem without having to enter TS 3.0.3. Depending on the valves inoperable, closure of the MFWP turbine stop valves (trip of the MFWPs),

closure of the MFIV, or closure of the MFRV and MFRV bypass valve will stop feedwater flow in the affected flow path under this condition.

Separate action entry for each valve would be allowed unless the inoperability of more than one valve would result in the loss of feedwater isolation capability for a flow path. Redundant components in the flow path would provide the feedwater isolation function.

The addition of the surveillance to verify that the MFRVs, MFRV bypass valves, and MFIVs actuate to the isolation position on an actual or simulated actuation signal would provide further assurance that the valves would perform their feedwater isolation function.

The proposed changes are consistent with the intent of NUREG-1431 related to the feedwater isolation function.

The response times for the closure of the MFRVs and MFRV bypass valves, and for the MFWP trip meet Criterion 2 of 10 CFR 50.36(c)(2)(ii). The MFRVs, MFRV bypass valves, MFIVs, and MFWP turbine stop valves meet Criterion 3 of 10 CFR 50.36(c)(2)(ii).

D. SAFETY EVALUATION

Safety Function of MFRVs, MFRV Bypass Valves, MFIVs, and MFWP Trip

One MFRV, MFRV bypass valve, and MFIV are located on each main feedwater line outside containment. The MFIVs, MFRVs, and MFRV bypass valves are located upstream of the auxiliary feedwater (AFW) injection point so that AFW may be supplied to the SGs following MFIV or MFRV and MFRV bypass valve closure. Two MFWP turbine stop valves (high pressure and low pressure) are located in the respective high pressure and low pressure steam lines to each MFWP turbine; they function to isolate the steam supply to the high pressure and low pressure MFWP turbine governor valves, tripping the associated MFWP.

The MFRVs and the MFRV bypass valves provide isolation of MFW flow to the secondary side of the SGs following excessive heat removal due to a feedwater system malfunction, accidental depressurization of the MSS, or major secondary system pipe rupture (either a feedwater line break or a main steam line break). Trip of the MFWP (closure of the MFWP turbine stop valves) and closure of the MFIVs also provide isolation of MFW flow, and are backups to the MFRVs and MFRV bypass valves. If an MFRV or MFRV bypass valve fails to close during an accident or transient, trip of the MFWPs and closure of the MFIVs would terminate feedwater flow to the SGs.

The MFRVs, MFRV bypass valves, and MFIVs close on receipt of any SIS or high-high SG water level signal. The MFRVs and MFRV bypass valves also close on a T_{avg} low coincident with reactor trip (P-4) signal. The MFWPs trip on any SIS or SG water level - high-high signal. Both SSPS actuation logic trains generate signals to close the MFRVs and the MFRV bypass valves. The MFIVs and MFWPs receive feedwater isolation signals from opposite SSPS actuation logic trains. The MFIVs close on a feedwater isolation signal from SSPS actuation logic Train A. The MFWPs trip on a feedwater isolation signal from SSPS actuation logic Train B.

As noted above, feedwater isolation is assumed for the following transients:

1. Excessive heat removal due to feedwater system malfunctions (Final Safety Analysis Report (FSAR) Update 15.2.10).

2. Accidental depressurization of the MSS (FSAR Update 15.2.14).

3. Major secondary system pipe rupture (FSAR Update 6.2.1.3.8, 15.4.2).

The related aspects of the analyses are summarized below:

1. Excessive Heat Removal Due to Feedwater System Malfunctions.

   The full power event analysis assumes that a control system malfunction or operator error causes an MFRV to open fully. The consequences of the event are limited by a reactor trip and feedwater isolation. Feedwater isolation is initiated by a high-high - SG water level signal from the affected SG. The delay time assumed for feedwater isolation is 9 seconds; the analysis takes credit for closure of the MFRVs and MFRV bypass valves for feedwater isolation.

   If either an MFRV or MFRV bypass valve fails to close, then feedwater isolation would occur with termination of feedwater flow in approximately 10 seconds by trip of the MFWPs, or closure of the MFIVs (60 second closure time) within 66 seconds of the initiating signal.

   The results of the FSAR Update analysis show that the minimum departure from nucleate boiling ratio (DNBR) is reached at 45.5 seconds, prior to the time that feedwater flow is isolated due to high-high SG water level at 51.0 seconds. Therefore, the results of the analysis in terms of DNBR would be unaffected if a longer feedwater isolation delay were assumed.

Trip of the MFWPs would also prevent overfill of the SGs in the event an MFRV or MFRV bypass valve fails to close.

2. Accidental Depressurization of the MSS.

Accidental depressurization of the MSS is associated with an inadvertent opening of a single steam dump, relief, or safety valve. The consequences of the event are limited by a reactor trip, safety injection (SI) initiation, and feedwater isolation. Feedwater isolation is initiated by an SIS.

This case is less limiting than a rupture of a main steam pipe discussed below.

3. Major Secondary System Pipe Rupture.

The consequences of a major secondary system steam pipe rupture are limited by a reactor trip, SI initiation, feedwater isolation, and steam line isolation. Feedwater isolation is initiated by an SIS.

The FSAR Update analysis assumes feedwater isolation by closure of the MFRVs and MFRV bypass valves at 9 seconds after the SIS.

If either an MFRV or MFRV bypass valve fails to close, trip of the MFWPs would reduce the flow to the faulted SG. Some continued feedwater addition could occur from the condensate pumps, since the SG pressure would eventually fall below the shutoff head of these pumps. The additional cooldown from continued feedwater addition prior to closure of the MFIVs (60 second closure time) within 63 seconds of the initiating SIS would be small. In addition, a conservatively large AFW flow addition is assumed. Also, the assumed single failure in the analysis is one train of SI. If the failure was assumed to be a flow control valve (MFRV or MFRV bypass valve) both trains of SI could be credited. Thus, the current analysis conservatively predicts the reactor coolant system cooldown that would occur.

Mass and energy releases for a range of steam pipe rupture cases are calculated for inside containment integrity analysis. Some of these cases specifically address the single failure of an MFRV, with backup isolation by the MFIVs. For other single failure assumptions, the MFRVs were assumed to isolate feedwater with a 9 second delay time from the SIS until feedwater flow is terminated.

Response Times

TS 3/4.3.2 includes response time surveillance requirements to ensure that individual channel ESF response times are less than or equal to the maximum values assumed in the accident analysis. The proposed changes to TS 3/4.3.2 add requirements for verification of the response times for feedwater isolation by closure of the MFRVs and MFRV bypass valves, and by trip of the MFWPs. These response times are now controlled by plant procedures.

The accident analysis assumes that the MFRVs and MFRV bypass valves close within 9 seconds of receipt of a feedwater isolation signal from the SSPS. The 9 seconds includes a 2 second signal processing delay and a 7 second valve closure time.

The accident analysis also assumes termination of MFWP flow following trip of the MFWPs within approximately 10 seconds of receipt of a feedwater isolation signal from the SSPS. The 10 seconds includes trip of the MFWPs within 5 seconds (2 second signal processing delay, 1 second slave relay time response limit, 1 second MFWP turbine stop valve closure, and 1 second for hardware margin) and pump coastdown following the trip such that forced flow is terminated within an additional 5 seconds.

The addition of the 9 second response time for the MFRVs and MFRV bypass valves and the 5 second response time (not including pump coastdown time) for the trip of the MFWPs to the TS will ensure that the assumptions for feedwater isolation in the accident analyses are satisfied.

The NRC reviewed the nonloss-of-coolant accident safety analysis feedwater isolation assumptions, including the above feedwater isolation times, provided in PG&E Letter DCL-91-282, "Summary of Main Feedwater Isolation Assumptions for the Safety Analysis Supporting License Amendment Request 90-14," dated November 22, 1991, and found them acceptable. Their conclusions are documented in the SE for LAs 77 and 76, for Units 1 and 2, respectively, dated March 18, 1993.

MFRVs, MFRV Bypass Valves, and MFIVs

The current TS 3/4.7.1.7 LCO requires that in each feedwater line each MFIV shall be operable or closed, and each MFRV and MFRV bypass valve shall be operable, closed, or isolated. Those requirements are applicable in Modes 1 (Power Operation), 2 (Startup), and 3 (Hot Standby). The proposed change moves the exceptions to the requirement that the MFIVs, MFRVs, and MFRV bypass valves be operable from the LCO to the Applicability. The proposed LCO and Applicability require that four MFIVs, four MFRVs, and four MFRV bypass

valves be operable in Modes 1, 2, and 3, except when an MFIV, MFRV, or MFRV bypass valve is closed and deactivated, or isolated by a closed manual valve. This change, consistent with NUREG-1431, is more restrictive than the current TS requirement in that a valve to be exempt from meeting the requirements of the LCO that it be operable must be closed and deactivated, or isolated by a closed manual valve. Deactivating a closed valve, or isolating it by a closed manual valve further insures that its safety function is being fulfilled.

With one MFIV, MFRV, or MFRV bypass valve inoperable in Modes 1, 2, or 3, the current TS Action requires that the operability be restored within 4 hours. If operability cannot be restored, the inoperable MFIV must be closed, or for the MFRV or MFRV bypass valves, the valve must be closed or isolated, or the unit must be placed in at least Mode 3 (if not already there) within the next 6 hours and in Mode 4 (Hot Shutdown) within the following 6 hours. Some repairs to a valve can be made during operation in Modes 1, 2, or 3; however, it may not be possible to complete those repairs and restore operability in 4 hours.

The proposed change, consistent with NUREG-1431, increases the AOT from 4 hours to 72 hours for an inoperable MFIV, MFRV, and MFRV bypass valve. The increased AOT provides a more reasonable time to diagnose the problem, mobilize corrective actions, obtain administrative clearances, complete the maintenance, restore the valve to an operable condition, and where appropriate, perform a post-maintenance verification. The additional time reduces the probability of unnecessary unit transients and unit shutdowns, thus improving unit safety. NUREG-1431 recognizes that the inoperability of one valve in the flow path does not render the feedwater isolation function inoperable. This conclusion is based on the isolation redundancy provided by the MFRVs and MFRV bypass valves, or the MFIVs and trip of the MFWPs. The proposed AOT is consistent with AOTs for other ESF equipment when the function is maintained.

The proposed change would allow separate action entry for each inoperable valve unless there is a loss of feedwater isolation capability for a flow path. Redundant components in the flow path would provide the feedwater isolation function.

The current TS permit a single valve in each flow path to be inoperable and open for the AOT, but would not permit a second valve affecting the feedwater isolation capability for that flow path to be inoperable and open. If a second valve became inoperable it would require entry into TS 3.0.3. The proposed change, consistent with NUREG-1431, adds an action for the condition where two valves are inoperable resulting in a loss of feedwater isolation capability for a flow path, allowing up to 8 hours to either restore one valve to an operable condition, or isolate the affected flow path. The 8 hour AOT provides sufficient

time to complete the actions required to otherwise isolate the affected flow path. If the affected valve or valves cannot be restored to operable status, or the flow path isolated, then the unit must be placed in a mode where the LCO does not apply. During this time period there is a low probability of an event occurring that would require feedwater isolation.

A probabilistic risk assessment (PRA) was performed to assess the increase in annual core damage frequency (CDF) associated with the increase in AOT from 4 hours to 72 hours, and for the 8 hour AOT for two valves inoperable in one line. Although the MFW system is conservatively assumed to be unavailable in the Diablo Canyon Power Plant PRA model, the increase in the AOT had the potential to increase the annual CDF in the following two ways: (1) the operation of the auxiliary feedwater system (AFWS) may be affected if the ability to provide an adequate pressure boundary (i. e., through feedwater isolation) is degraded due to a longer AOT, and (2) for secondary depressurization events such as steam line breaks, continued injection of feedwater may adversely affect pressurized thermal shock (PTS) due to a more rapid cooldown of the reactor vessel. The affect on the AFWS was quantified in the PRA model by conservatively assuming that during the AOT period, the entire AFWS would fail given the failure of the feedwater isolation check valve, and giving no credit to any other operable valve in the feedwater line. In this conservative analysis, the increase in annual CDF was approximately 1.5 percent. The effect on PTS did not need to be quantified since an evaluation in the original PRA model (performed as part of the Long Term Seismic Program and submitted to the NRC in 1988) indicated that PTS after secondary depressurization events was relatively insensitive to the time of feedwater isolation. The maximum 1.5 percent increase in annual CDF due to the proposed changes is considered nonrisk significant per the Electric Power Research Institute "PSA Application Guide."

The proposed changes to increase the valve AOTs are consistent with recommendations from NUREG-1024, "Technical Specifications - Enhancing the Safety Impact." NUREG-1024 states in part: *"Allowable outage times that are too short will subject the unit to unnecessary trips, transients and fatigue cycling. Outage times that are too short also may result in less thorough repair and post repair testing before equipment is returned to service."*

The proposed TS 4.7.1.7.4 surveillance would require verification that the MFIVs, MFRVs, and MFRV bypass valves would actuate to the closed position on an actual or simulated actuation signal at least once every 24 months. The surveillance allows credit for an actual actuation, if one occurs, to satisfy the surveillance requirement. Either an actual or simulated actuation signal will permit verification of the component safety function. The change is more restrictive than the current TS requirements, and is consistent with NUREG-1431

requirements. This surveillance is currently required by plant procedure to be performed at least every refueling. A review of surveillance, maintenance, and operating histories identified no unresolved recurring or time dependent problems that could affect the ability of the valves to close on an actual or simulated actuation signal when tested on the proposed surveillance frequency. This review included the following for each valve, valve actuator, and associated solenoid valve: surveillance test procedures (STP), action requests (AR), nonconformance reports (NCR), component failure reports, component work order histories, and industry experience. The Preventive Maintenance Programs for these valves also provide assurance that the valves will operate satisfactorily when tested on the proposed surveillance test frequency. The MFIVs, MFRVs, and MFRV bypass valves are within the scope of PG&E's program for implementing the Maintenance Rule (10 CFR 50.65).

The 24 month surveillance frequency is consistent with that for the automatic actuation logic and actuation relays - slave relay tests for the SI and turbine trip and feedwater isolation functional units, which are performed each refueling interval (at least once per 24 months). Performing these tests on a refueling frequency will minimize the risks associated with unnecessary ESF actuations or reactor trips.

MFWP Turbine Stop Valves

TS 3/4.7.1.7 includes LCOs, actions, and surveillance requirements for the MFRVs, MFRV bypass valves, and MFIVs. The proposed changes to TS 3/4.7.1.7 add an LCO, actions, and surveillance requirements for the MFWP turbine stop valves to assure their ability to trip the MFWPs on a feedwater isolation signal.

TS 3/4.7.1.7 would be revised to require the MFWP turbine stop valves to be operable. The MFWP turbine stop valves go closed on an SI or SG water level - high-high signal (as well as other pump related trips), tripping the MFWPs. This is a Class II trip, and is credited as a backup to the single failure of an MFRV or MFRV bypass valve to close. The NRC considered the use of the Class II MFWP trip for feedwater isolation acceptable as a backup to the MFRVs and MFRV bypass valves in the SE for LAs 77 and 76, dated March 18, 1993. The MFWP turbine stop valves are considered operable when their closure times are within the limit, and they close on a feedwater isolation signal.

The proposed requirements would be applicable in Modes 1, 2, and 3, except when the MFWP turbine stop valves are closed and the steam supplies to the MFWP turbine are isolated, or the MFWP discharge is isolated by a closed manual valve. This applicability is consistent with the modes where the MFWPs are in operation. A single MFWP is operated at low power levels. It is placed in

service and taken out-of-service at approximately 2 percent power. Below approximately 2 percent power, the AFW system provides feedwater to the SGs. Prior to placing an MFWP in operation the MFWP turbine stop valves are closed and the high pressure and low pressure steam supplies to the MFWP turbine are isolated. When the MFWP turbine stop valves are closed and the steam supplies to the MFWP turbine stop valves are isolated, or the MFWP discharge is isolated by a closed manual valve, the safety function of the MFWP turbine stop valves is already performed.

If one or more MFWP turbine stop valves become inoperable, the proposed actions would require that the valve be restored to an operable status, or closed or the MFWP tripped or the MFWP discharge isolated within 72 hours, with verification once per 7 days that the valve is closed, or the MFWP tripped, or the MFWP discharge isolated. These actions are consistent with the actions in NUREG-1431 for the feedwater isolation function. The 72 hour AOT takes into account the redundant MFW isolation valves and the low probability of an event occurring during this time period that would require isolation of the feedwater flow paths. The once per 7 day AOT is based on the availability of valve/pump status indications in the control room, and administrative controls that would ensure the valve is closed, the MFWP is tripped, or the MFWP discharge is isolated while the MFWP turbine stop valve remains inoperable.

The proposed change would allow separate action entry for each inoperable valve unless there is a loss of feedwater isolation capability for a flow path. Redundant components in the flow path would provide the feedwater isolation function.

The proposed surveillances would require that the closure time of each MFWP turbine stop valve be less than or equal to 1 second (not including instrument delays) when tested at least each cold shutdown, but not more frequently than once per 92 days. This closure time is consistent with the proposed total channel response time. The frequency is the same as the current TS surveillance frequency for the MFRV and MFRV bypass valve isolation time. The proposed surveillances would also require verification that the MFWP turbine stop valves actuate to the closed position on an actual or simulated actuation signal at least once every 24 months. The surveillance allows credit for an actual actuation, if one occurs, to satisfy the surveillance requirement. Either an actual or simulated actuation signal will permit verification of the component safety function. The change is more restrictive than the current TS requirements, and is consistent with NUREG-1431 requirements. These surveillances are currently required by plant procedures to be performed at least every refueling.

A review of surveillance, maintenance, and operating histories was done to

identify recurring or time dependent problems that could affect the ability of the valves to close within the specified response time on an actual or simulated actuation signal when tested on the proposed surveillance frequency. This review included the following for each valve, valve actuator, and associated solenoid valve: STPs, ARs, NCRs, component failure reports, component work order histories, and industry experience.

The review identified control oil cleanliness problems which, until recently, only affected the solenoid operated (electric) Racine valves used to open and close the high pressure and low pressure MFWP turbine stop valves, and not the hydraulic Racine valves which function to trip the high pressure and low pressure MFWP turbine stop valves, tripping the MFWPs, in response to a feedwater isolation signal. Problems due to control oil cleanliness were experienced with the hydraulic Racine valves for MFWPs 1-2 and 2-1 during testing in January 1998. No other recurring or time dependent problems were identified.

The control oil cleanliness problems resulted from water contamination of the oil system, and material incompatibility with the environment (carbon steel components and oil with a high moisture content). The control oil system was designed with small tolerances, and the associated oil purification systems with limited capability. Under normal circumstances, the existing centrifuge and inline filters maintain the oil system within acceptable quality limits.

Actions taken as a result of the recent control oil cleanliness problems to ensure MFWP trip reliability include the following:

1. Periodic collection and analysis of the oil upstream and downstream of the control oil filters for water and particulate at a frequency that allows prompt corrective action to maintain moisture content and particulate as low as practical (indication of excessive water or particulate would give early warning of any degradation mechanism in progress),

2. Periodic cleanup of the control oil using oil purifier/dehumidifier,

3. Periodic inspection/refurbishment of the low pressure and high pressure stop and governor valve actuators,

4. Periodic inspection/replacement of the hydraulic and electric Racine valves,

5. Periodic exercise of the electric Racine valves and stop valve actuators, and

6. Routine bottom suction on the four MFWP oil reservoirs to preclude

mixing of any free water in the reservoirs during transients.

The Preventive/Predictive Maintenance Programs for the MFWP turbine stop valves, including the above actions, provide assurance that the MFWP turbine stop valves will operate satisfactorily when tested on the proposed surveillance frequency. The MFWP turbine stop valves are within the scope of PG&E's program for implementing the Maintenance Rule (10 CFR 50.65). Because of the problems related to control oil cleanliness, goals have been established for the MFWP turbine stop valves, and their performance is currently being monitored as required by 10 CFR 50.65(a)(1).

The 24 month surveillance frequency for the verification that the valve would actuate to the closed position on an actual or simulated actuation signal is consistent with that for the automatic actuation logic and actuation relays - slave relay tests for the SI and turbine trip and feedwater isolation functional units, which are performed each refueling interval (at least once per 24 months). Performing these tests on a refueling frequency will minimize the risks associated with unnecessary ESF actuations or reactor trips.

The addition of these requirements will provide assurance that the MFWP turbine stop valves are operable and will trip the MFWPs on a feedwater isolation signal.

Conclusion

The addition of the response time requirements for the MFRVs, MFRV bypass valves, and trip of the MFWPs will ensure that these components will perform their required safety function for feedwater isolation, and that the assumptions of the accident analyses are satisfied.

The addition of the LCO, actions, and surveillance requirements for the MFWP turbine stop valves will ensure that the valves are operable and will isolate the steam supply to the high pressure and low pressure MFWP turbine governor valves, tripping the associated MFWPs, and terminating feedwater flow upon receipt of an SIS or high-high SG water level signal initiating feedwater isolation. The addition of the surveillance requirement to require verification that the MFIVs, MFRVs, and MFRV bypass valves would actuate to the closed position on an actual or simulated actuation signal at least once every 24 months, provides further assurance that these components will perform their required safety function for feedwater isolation.

The changes to the current TS requirements to allow additional time to diagnose and correct problems prior to initiating a unit shutdown, or when two valves are inoperable affecting the feedwater isolation capability of a flow path, will avoid subjecting the unit to unnecessary trips, transients, and fatigue cycling. During

the time a valve or valves are inoperable, either a redundant means of feedwater isolation is available, or because of the short AOT, there is a low probability of an event occurring that would require feedwater isolation.

Therefore, based on the above, PG&E believes there is reasonable assurance that the health and safety of the public will not be adversely affected by the proposed TS changes.

E. NO SIGNIFICANT HAZARDS EVALUATION

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

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

   The proposed changes to the Technical Specifications (TS) to add response time requirements for the main feedwater regulating valve (MFRV) and associated bypass valves and the main feedwater pump (MFWP) trip provide more restrictive TS requirements that are consistent with current plant practice. They do not change the function or operation of any plant equipment or affect the response of that equipment if it is called upon to operate. These more restrictive requirements are imposed to ensure the affected components are maintained consistent with the safety analyses and licensing bases.

The proposed changes to: (1) revise the actions to apply to one or more main feedwater isolation valves (MFIVs), and MFRVs and associated bypass valves, (2) extend the action completion time from 4 hours to 72 hours, (3) provide actions when two valves affecting the feedwater isolation capability for a flow path are inoperable, (4) add actions for an inoperable MFWP turbine stop valve, and (5) allow separate action entry for each inoperable valve unless the feedwater isolation capability for a flow path is affected, do not change the function or operation of any plant equipment or affect the response of that equipment if it is called on to operate. The actions account for the redundancy provided by the remaining valves and the MFWP trip, and the low probability of an event occurring during this time period that would require isolation of the main feedwater flow path. A probabilistic risk assessment, performed to assess the increase in annual core damage frequency (CDF) associated with the increase in allowable outage time, determined the increase in annual CDF to be approximately 1.5 percent. That increase in annual CDF is considered non-risk significant per the Electric Power Research Institute "PSA Application Guide."

The addition of the limiting condition for operaton, actions, and surveillance requirements for the MFWP turbine stop valves, and the addition of the surveillance requirement for the MFIVs, MFRVs, and MFRV bypass valves are more restrictive requirements that ensure these components are operable and capable of performing their safety function. They do not change the function or operation of any plant equipment or affect the response of that equipment if it is called on to operate. The proposed surveillance intervals are supported by the operating, maintenance, and surveillance histories of the valves.

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 do not necessitate a physical alteration of the plant (no new or different type of equipment will be installed) or changes in the parameters governing normal plant operation. The changes imposed are consistent with the assumptions made in the accident analyses and licensing basis.

Therefore, the proposed changes 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?*

The proposed changes to the TS impose requirements consistent with the assumptions in the safety analyses and current licensing bases, and reflect current plant practice. They do not alter the margins of safety established in previous accident and transient analysis.

Therefore, none of the proposed changes involves a significant reduction in a margin of safety.

F. NO SIGNIFICANT HAZARDS DETERMINATION

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

G. ENVIRONMENTAL EVALUATION

PG&E has evaluated the proposed changes and determined the changes do 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 changes meet the eligibility criteria 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.