Pacific Gas and Electric Company

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PG&E Letter DCL-99-151

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Docket No. 50-275, OL-DPR-80
Docket No. 50-323, OL-DPR-82
Diablo Canyon Units 1 and 2
Supplement to 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:

In PG&E Letter DCL-98-109, "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,' " dated August 10, 1998, PG&E submitted a request to amend Facility Operating License Nos. DPR-80 and DPR-82, for Diablo Canyon Power Plant (DCPP) Units 1 and 2, respectively. License Amendment Request (LAR) 98-05 proposed revision of 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 (MFRVs) and associated bypass valves, and for trip of the main feedwater pumps (MFWPs). Also, LAR 98-05 proposed to revise TS 3/4.7.1.7 to add a limiting condition for operation, 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 to be consistent with NUREG-1431, "Standard Technical Specifications - Westinghouse Plants," Revision 1, April 1995, requirements. In PG&E Letter DCL-97-106, "Technical Specification Conversion License Amendment Request," dated June 2, 1997, PG&E submitted LAR 97-09 to convert the current TS (CTS) to improved TS (ITS) based on NUREG-1431. Changes proposed in LAR 97-09 applicable to TS 3/4.7.1.7 were included in LAR 98-05.

Subsequent to the submittal of LAR 98-05, Amendments 135 and 135 were issued to Facility Operating License Nos. DPR-80 and DPR-82, converting the CTS for

A001

DCPP to the ITS. This supplement revises the proposed ITS pages included in LAR 98-05 to include the changes approved in Amendments 135 and 135. Changes to the CTS pages submitted in LAR 98-05 are not required.

Changes to the ITS are noted in the marked up copies of the ITS pages and Bases provided in Enclosure A. These pages supersede the corresponding pages provided in DCL-98-109. The proposed ITS pages and Bases are provided in Enclosure B. The changes proposed in this supplement do not impact the safety evaluation or the no significant hazards consideration determination provided in LAR 98-05.

Sincerely,

David H. Oatley

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

Enclosures

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

David H. Oatley, of lawful age, first being duly sworn upon oath says that he is Vice President - Diablo Canyon Operations and Plant Manager of Pacific Gas and Electric Company; that he is familiar with the content thereof; that he has executed this supplement to 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.

David H. Oatley
Vice President - Diablo Canyon Operations
and Plant Manager

Subscribed and sworn to before me this 24th day of November, 1999.
State of California
County of San Luis Obispo

Notary Public

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

MARKED-UP IMPROVED TECHNICAL SPECIFICATIONS AND BASES

Remove Page	Insert Page
3.7-6	3.7-6
-	3.7-6 Inserts
3.7-7	3.7-7
-	3.7-7 Insert
B 3.7-12	B 3.7-12
B 3.7-13	B 3.7-13
-	B 3.7-13 Insert
B 3.7-14	B 3.7-14
-	B 3.7-14 Insert
B 3.7-15	B 3.7-15
-	B 3.7-15 Insert
B 3.7-16	B 3.7-16
-	B 3.7-16 Inserts
B 3.7-17	B 3.7-17
-	B 3.7-17 Insert

3.7 PLANT SYSTEMS

3.7.3 Main Feedwater Isolation Valves (MFIVs), Main Feedwater Regulating Valves (MFRVs), ~~and~~ MFRV Bypass Valves, and Main Feedwater Pump (MFWP) Turbine Stop Valves

LCO 3.7.3 Four MFIVs, four MFRVs, ~~and~~ four MFRV bypass valves, and four MFWP turbine stop valves shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3 except when MFIV, MFRV, or ~~four~~ MFRV bypass valves ~~are~~ is closed and de-activated or isolated by a closed manual valve.

INSERT A

ACTIONS

NOTE

Separate Condition entry is allowed for each valve.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more MFIVs inoperable.	A.1	Close or isolate MFIV.	72 hours
	AND		
	A.2	Verify MFIV is closed or isolated.	Once per 7 days
B. One or more MFRVs inoperable.	B.1	Close or isolate MFRV.	72 hours
	AND		
	B.2	Verify MFRV is closed or isolated.	Once per 7 days
C. One or more MFRV bypass valve(s) inoperable.	C.1	Close or isolate bypass valve.	72 hours
	AND		
	C.2	Verify bypass valve is closed or isolated.	Once per 7 days
INSERT B			
E ~~D.~~ Two valves in the same flow path inoperable.	~~D.1~~ E	Isolate affected flow path.	8 hours
F ~~E.~~ Required Action and associated Completion Time not met.	~~E.1~~ F	Be in MODE 3	6 hours
	AND		
	~~E.2~~ F	Be in MODE 4.	12 hours

resulting in a loss of feedwater isolation capability for the flow path

INSERT A

or when MFWP turbine stop valve is closed and steam supply to the MFWP turbine is isolated, or when MFWP discharge is isolated by a closed manual valve.

INSERT B

D. One or more MFWP turbine stop valves inoperable.	D.1.1 Close MFWP turbine stop valve. OR D.1.2 Trip MFWP. OR D.1.3 Isolate MFWP discharge. AND D.2 Verify MFWP turbine stop valve closed, MFWP tripped, or MFWP discharge isolated.	72 hours 72 hours 72 hours Once per 7 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.3.1	Verify the closure time of each MFIV is ≤ 60 seconds.	In accordance with the Inservice Testing Program
SR 3.7.3.2	Verify the closure time of each MFRV and MFRV bypass valve is ≤ 7 seconds.	At each COLD SHUTDOWN, but not more frequently than once per 92 days
SR 3.7.3.3	Verify each MFIV, MFRV, ~~and~~ MFRV bypass valve, and MFWP turbine stop valve actuates to the ~~isolation~~ closed position on an actual or simulated actuation signal.	24 months

INSERT C

INSERT C

SR 3.7.3.4	Verify the closure time of each MFWP turbine stop valve is ≤ 1 second.	At each COLD SHUTDOWN, but not more frequently than once per 92 days.

B 3.7 PLANT SYSTEMS

B 3.7.3 Main Feedwater Isolation Valves (MFIVs) ~~and~~ Main Feedwater ~~Regulation~~ Regulating Valves (MFRVs) and MFRV Bypass Valves, and Main Feedwater Pump (MFWP) Turbine Stop Valves

BASES

BACKGROUND

The safety related function of the MFRVs and the MFRV bypass valves is to provide the initial isolation of main feedwater (MFW) flow to the secondary side of the steam generators following a high energy line break (HELB). Since the MFRVs and MFRV bypass valves are located in non-safety related piping, the MFIVs also provide safety related isolation of the MFW flow to the secondary side of the steam generators a short time later. Closure of the MFRVs and MFRV bypass valves or tripping of the ~~feedwater pumps~~ MFWPs and closure of the MFIVs a short time later terminates flow to the steam generators, terminating the event for feedwater line breaks (FWLBs) occurring upstream of the MFIVs or MFRVs. The consequences of events occurring in the main steam lines or in the MFW lines downstream from the MFIVs will be mitigated by their closure. Closure of the MFRVs and MFRV bypass valves, or tripping of the ~~feedwater pumps~~ MFWPs and closure of the MFIVs a short time later effectively terminates the addition of feedwater to an affected steam generator, limiting the mass and energy release for steam line breaks (SLBs) or FWLBs inside containment, and reducing the cooldown effects for SLBs.

The MFIVs isolate the non-safety related portions from the safety related portions of the system. In the event of a secondary side pipe rupture inside containment, the valves limit the quantity of high energy fluid that enters containment through the break, and provide a pressure boundary for the controlled addition of auxiliary feedwater (AFW) to the intact loops.

One MFIV and one MFRV and MFRV bypass valve, are located on each MFW line, outside but close to containment. The MFIVs and MFRVs are located upstream of the AFW injection point so that AFW may be supplied to the steam generators following MFIV or MFRV closure. The piping volume from these valves to the steam generators must be accounted for in calculating mass and energy releases, and refilled prior to AFW reaching the steam generator following either an SLB or FWLB.

(continued)

BASES

BACKGROUND (continued)

The MFIVs and MFRVs and MFRV bypass valves, close on receipt of any safety injection (SI) signal, or steam generator (S/G) water level - high high signal. They may also be actuated manually. The Main ~~Feedwater Pump~~ MFWP Turbine is also tripped upon receipt of an SI or S/G water level - high high signal (as well as other pump related trips), however, these are Class II trips and are only credited as a backup to the single failure of a MFRV and MFRV bypass valve trip. The MFRVs and MFRV bypass valves also close on receipt of a T_{avg} - Low coincident with reactor trip (P-4). In addition to the MFIVs and the MFRVs and MFRV bypass valves, a check valve located upstream of the MFIV is available. The check valve isolates the feedwater line, penetrating containment, and ensures that the intact steam generators do not continue to feed the feedwater line break in the non-safety related piping upstream of the feedwater isolation check valves and that the AFW flow will be to the steam generators.

A description of the MFIVs, MFRVs, and MFRV bypass valves is found in the FSAR, Section 10.4.7 (Ref. 1).

APPLICABLE SAFETY ANALYSES

The design basis of the MFIVs, MFRVs, and MFRV bypass valves is established by the analyses for the large SLB. It is also influenced by the accident analysis for the large FWLB. Closure of the MFRVs and MFRV bypass valves or tripping of the ~~feedwater pumps~~ MFWPs and closure of the MFIVs a short time later, is relied on to terminate an SLB for core and containment response analysis and excess feedwater event upon the receipt of a feedwater ~~isolation signal on high-high steam generator~~ level. or failure of the MFWPs to trip

Failure of an MFIV, MFRV, or the MFRV bypass valves to close, and MFWP trip, following an SLB or FWLB can result in additional mass and energy being delivered to the steam generators, contributing to cooldown. This failure also results in additional mass and energy releases following an SLB or FWLB event.

The MFIVs, MFRVs, and MFRV bypass valves and tripping of the MFWPs satisfy Criterion 3 of 10 CFR 50.36 (c) (2) (ii).

LCO

This LCO ensures that the MFIVs, MFRVs and MFRV bypass valves will isolate MFW flow to the steam generators, following an FWLB or main steam line break, or an excessive feedwater event. The MFIVs will also isolate the non-safety related portions from the safety related portions of the system.

This LCO requires that four MFIVs, four MFRVs and four MFRV bypass valves be OPERABLE. The MFIVs and MFRVs and MFRV bypass valves are considered OPERABLE when isolation times are within limits and they close on an isolation actuation signal.

INSERT D

(continued)

INSERT D

This LCO also requires that the MFWP turbine stop valves be OPERABLE. The MFWP turbine stop valves are considered OPERABLE when their closure times are within limit and they close on a feedwater isolation actuation signal.

BASES

LCO (continued)

Failure to meet the LCO requirements can result in additional mass and energy being released to containment following an SLB or FWLB inside containment. A feedwater isolation signal on high steam generator level is relied on to terminate an excess feedwater flow event and failure to meet the LCO may result in the introduction of water into the main steam lines. and the MFWP turbine stop valves

APPLICABILITY

The MFIVs, MFRVs and MFRV bypass valves must be OPERABLE whenever there is significant mass and energy in the Reactor Coolant System and steam generators. This ensures that, in the event of an HELB, a single failure cannot result in the blowdown of more than one steam generator. In MODES 1, 2, and 3, the MFIVs, MFRVs and MFRV bypass valves are required to be OPERABLE to limit the amount of available fluid that could be added to containment in the case of a secondary system pipe break inside containment. When the valves are closed and de-activated or isolated by a closed manual valve, they are already performing their safety function.

INSERT E

In MODES 4, 5, and 6, steam generator energy is low. Therefore, the MFIVs, MFRVs, and MFRV bypass valves are normally closed and the MFWPs are tripped since MFW is not required.

ACTIONS

The ACTIONS table is modified by a Note indicating that separate Condition entry is allowed for each valve.

A.1 and A.2

With one MFIV in one or more flow paths inoperable, action must be taken to restore the affected valves to OPERABLE status, or to close or isolate inoperable affected valves within 72 hours. When these valves are closed or isolated, they are performing their required safety function.

The 72 hour Completion Time takes into account the redundancy afforded by the remaining OPERABLE valves and the Class II main feedwater pump trip and the low probability of an event occurring during this time period that would require isolation of the MFW flow paths. The 72 hour Completion Time is reasonable, based on operating experience.

Inoperable MFIVs that are closed or isolated must be verified on a periodic basis that they are closed or isolated. This is necessary to ensure that the assumptions in the safety analysis remain valid. The 7 day Completion Time is reasonable, based on engineering judgment, in view of valve status indications available in the control room, and other administrative controls, to ensure that these valves are closed or isolated.

(continued)

INSERT E

In MODES 1, 2, and 3, the MFIVs, MFRVs, MFRV bypass valves, and the MFWP turbine stop valves are required to be OPERABLE to limit the amount of available fluid that could be added to the steam generators in the case of a secondary system pipe break inside containment or an excessive feedwater event. They are not required to be OPERABLE when the MFIVs, MFRVs, and MFRV bypass valves are closed and deactivated or isolated by a closed manual valve, or when the MFWP turbine stop valves are closed and the steam supplies to the MFWP turbine stop valves are isolated, or the MFWP discharge to the steam generators is isolated by a closed manual valve.

When the MFIVs, MFRVs, and MFRV bypass valves are closed and de-activated or isolated by a closed manual valve, they are already performing their safety function. A single MFWP is operated at low power levels. It is placed in service and taken out of service at approximately 2 percent power. Before a MFWP is placed 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 to the steam generators is isolated by a closed manual valve, the safety function of the MFWP turbine stop valves is being performed.

BASES

ACTIONS (continued)

B.1 and B.2

With one MFRV in one or more flow paths inoperable, action must be taken to restore the affected valves to OPERABLE status, or to close or isolate inoperable affected valves within 72 hours. When these valves are closed or isolated, they are performing their required safety function.

The 72 hour Completion Time takes into account the redundancy afforded by the remaining OPERABLE valves and the Class II main feedwater pump trip and the low probability of an event occurring during this time period that would require isolation of the MFW flow paths. The 72 hour Completion Time is reasonable, based on operating experience.

Inoperable MFRVs, that are closed or isolated, must be verified on a periodic basis that they are closed or isolated. This is necessary to ensure that the assumptions in the safety analysis remain valid. The 7 day Completion Time is reasonable, based on engineering judgment, in view of valve status indications available in the control room, and other administrative controls to ensure that the valves are closed or isolated.

C.1 and C.2

With one MFRV bypass valve in one or more flow paths inoperable, action must be taken to restore the affected valves to OPERABLE status, or to close or isolate inoperable affected valves within 72 hours. When these valves are closed or isolated, they are performing their required safety function.

The 72 hour Completion Time takes into account the redundancy afforded by the remaining OPERABLE valves and the Class II main feedwater pump trip and the low probability of an event occurring during this time period that would require isolation of the MFW flow paths. The 72 hour Completion Time is reasonable, based on operating experience.

Inoperable MFRV bypass valves that are closed or isolated must be verified on a periodic basis that they are closed or isolated. This is necessary to ensure that the assumptions in the safety analysis remain valid. The 7 day Completion Time is reasonable, based on engineering judgment, in view of valve status indications available in the control room, and other administrative controls, to ensure that these valves are closed or isolated.

INSERT F

(continued)

INSERT F

D.1.1, D.1.2, D.1.3, D.1.4, and D.2

With one MFWP turbine stop valve inoperable, action must be taken to restore the affected valve to OPERABLE status or close the affected valve, trip the MFWP, or isolate the MFWP discharge within 72 hours. When the MFWP turbine stop valve is closed, the MFWP is tripped, or the MFWP discharge to the steam generators is isolated, the feedwater isolation safety function is being performed.

The 72 hour Completion Time takes into account the redundancy afforded by the remaining OPERABLE valves and the low probability of an event occurring during this time period that would require termination of MFW flow. The 72 hour Completion Time is reasonable, based on operating experience.

Closure of the MFWP turbine stop valve, trip of the MFWP, or isolation of the MFWP discharge must be verified on a periodic basis to ensure that the assumptions in the safety analysis remain valid. The 7 day Completion Time is reasonable, based on engineering judgment, in view of valve or pump status indicators available in the control room, and other administrative controls, to ensure that the MFWP turbine stop valve is closed, the MFWP is tripped, or the MFWP discharge is isolated.

BASES

ACTIONS (continued)

~~D.1~~ E.1

INSERT G

~~With two inoperable valves in the same flow path, only the Class II main feedwater pump trip is available to operate automatically and perform the required safety function. Although the containment can be isolated with the failure of two valves in parallel in the same flow path, the double failure can be an indication of a common mode failure in the valves of this flow path, and as such, is treated the same as a loss of the isolation capability of this flow path. Under these conditions, affected valves in each flow path must be restored to OPERABLE status, or the affected flow path isolated within 8 hours. This action returns the system to the condition where at least one valve in each flow path is performing the required safety function. The 8 hour Completion Time is reasonable, based on operating experience, to complete the actions required to close the MFIV, MFRV, or MFRV bypass valve or otherwise isolate the affected flow path.~~

~~E.1 and E.2~~ F.1 and F.2

INSERT H

If the MFIV(s), MFRV(s) and the MFRV bypass valve(s) cannot be restored to OPERABLE status, or closed, or isolated within the associated Completion Time, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours, and in MODE 4 within 12 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE REQUIREMENTS

SR 3.7.3.1 and SR 3.7.3.2

These SRs verify that the closure time of each MFIV is ≤ 60 seconds and that each MFRV, and MFRV bypass valves is ≤ 7 seconds, not including the instrument delays. The MFIV and MFRV and MFRV bypass valve closure times are assumed in the accident and containment analyses. These Surveillances are normally performed upon returning the unit to operation following a refueling outage. These valves should not be tested at power since even a part stroke exercise increases the risk of a valve closure with the unit generating power. This is consistent with the ASME Code (Ref. 2) stroke requirements during operation in MODES 1 and 2.

The Frequency for these SRs is in accordance with the Inservice Testing Program.

(continued)

INSERT G

With either a MFRV or MFRV bypass valve and MFIV inoperable, or MFWP turbine stop valve (resulting in a loss of MFWP trip function) and MFRV or MFRV bypass valve inoperable, there may be no redundant system to operate automatically and perform the required safety function. Under these conditions, affected valves in each flow path must be restored to OPERABLE status, or the affected flow path isolated within 8 hours. This action returns the system to the condition where at least one valve in each flow path is performing the required safety function. With both a MFWP turbine stop valve and MFIV inoperable, the MFRV and MFRV bypass valve will operate automatically to provide feedwater isolation for the flow path. The 8 hour Completion Time is reasonable, based on operating experience, to complete the actions required to close the MFIV, MFRV, MFRV bypass valve, or MFWP turbine stop valve, or otherwise isolate the affected flow path.

INSERT H

or the MFWP turbine stop valve(s) cannot be restored to an OPERABLE status, closed, the MFWP tripped, or the MFWP discharge isolated,

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.7.3.3

and MFWP turbine stop valve

This SR verifies that each MFIV, MFRV, ~~and~~ MFRV bypass valve, can close on an actual or simulated actuation signal. This Surveillance is normally performed upon returning the plant to operation following a refueling outage. The Frequency of MFIV, MFRV, ~~and~~ MFRV bypass valve, testing is every 24 months. The 24 month Frequency is based on the refueling cycle. Operating experience has shown that these components ~~usually~~ are reliable and can be expected to pass the Surveillance when performed at the 24 month Frequency. Therefore, this Frequency is acceptable from a reliability standpoint. INSERT 1

REFERENCES

1. FSAR, Section 10.4.7.
2. ANSI/ASME OM-1-1987, (including OM-a-1988 ADDENDA).

INSERT I

SR 3.7.3.4

This SR verifies that the closure time of each MFWP turbine stop valve is ≤ 1 second, not including the instrument delays. The MFWP turbine stop valve closure times are assumed in the accident and containment analyses. These surveillances are normally performed on returning the unit to operation following a refueling outage. The Frequency is the same as that for the MFRVs and the MFRV bypass valves.
Preventive/predictive maintenance related to the MFWP turbine stop valves, and actions initiated in response to control oil cleanliness problems, shall be performed to ensure reliability of the MFWP trip function.

PROPOSED IMPROVED TECHNICAL SPECIFICATIONS AND BASES

3.7 PLANT SYSTEMS

3.7.3 Main Feedwater Isolation Valves (MFIVs), Main Feedwater Regulating Valves (MFRVs), MFRV Bypass Valves, and Main Feedwater Pump (MFWP) Turbine Stop Valves

LCO 3.7.3 Four MFIVs, four MFRVs, four MFRV bypass valves, and four MFWP turbine stop valves shall be OPERABLE

APPLICABILITY: 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 the MFWP turbine is isolated, or when MFWP discharge is isolated by a closed manual valve.

ACTIONS

----------NOTE----------
Separate Condition entry is allowed for each valve.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more MFIVs inoperable.	A.1	Close or isolate MFIV.	72 hours
	AND		
	A.2	Verify MFIV is closed or isolated.	Once per 7 days
B. One or more MFRVs inoperable.	B.1	Close or isolate MFRV.	72 hours
	AND		
	B.2	Verify MFRV is closed or isolated.	Once per 7 days
C. One or more MFRV bypass valve(s) inoperable.	C.1	Close or isolate bypass valve.	72 hours
	AND		
	C.2	Verify bypass valve is closed or isolated.	Once per 7 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. One or more MFWP turbine stop valves inoperable.	D.1.1 Close MFWP turbine stop valve. OR D.1.2 Trip MFWP. OR D.1.3 Isolate MFWP discharge. AND D.2 Verify MFWP turbine stop valve closed, MFWP tripped, or MFWP discharge isolated.	72 hours 72 hours 72 hours Once per 7 days
E. Two valves in the same flow path inoperable, resulting in a loss of feedwater isolation capability for the flow path.	E.1 Isolate affected flow path.	8 hours
F. Required Action and associated Completion Time not met.	F.1 Be in MODE 3 AND F.2 Be in MODE 4.	6 hours 12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.3.1	Verify the closure time of each MFIV is ≤ 60 seconds.	In accordance with the Inservice Testing Program
SR 3.7.3.2	Verify the closure time of each MFRV and MFRV bypass valve is ≤ 7 seconds.	At each COLD SHUTDOWN, but not more frequently than once per 92 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.7.3.3	Verify each MFIV, MFRV, MFRV bypass valve, and MFWP turbine stop valve actuates to the closed position on an actual or simulated actuation signal.	24 months
SR 3.7.3.4	Verify the closure time of each MFWP turbine stop valve is ≤ 1 second.	At each COLD SHUTDOWN, but not more frequently than once per 92 days.

B 3.7 PLANT SYSTEMS

B 3.7.3 Main Feedwater Isolation Valves (MFIVs), Main Feedwater Regulating Valves (MFRVs), MFRV Bypass Valves, and Main Feedwater Pump (MFWP) Turbine Stop Valves

BASES

BACKGROUND

The safety related function of the MFRVs and the MFRV bypass valves is to provide the initial isolation of main feedwater (MFW) flow to the secondary side of the steam generators following a high energy line break (HELB). Since the MFRVs and MFRV bypass valves are located in non-safety related piping, the MFIVs also provide safety related isolation of the MFW flow to the secondary side of the steam generators a short time later. Closure of the MFRVs and MFRV bypass valves or tripping of the MFWPs and closure of the MFIVs a short time later terminates flow to the steam generators, terminating the event for feedwater line breaks (FWLBs) occurring upstream of the MFIVs or MFRVs. The consequences of events occurring in the main steam lines or in the MFW lines downstream from the MFIVs will be mitigated by their closure. Closure of the MFRVs and MFRV bypass valves, or tripping of the MFWPs and closure of the MFIVs a short time later effectively terminates the addition of feedwater to an affected steam generator, limiting the mass and energy release for steam line breaks (SLBs) or FWLBs inside containment, and reducing the cooldown effects for SLBs.

The MFIVs isolate the non-safety related portions from the safety related portions of the system. In the event of a secondary side pipe rupture inside containment, the valves limit the quantity of high energy fluid that enters containment through the break, and provide a pressure boundary for the controlled addition of auxiliary feedwater (AFW) to the intact loops.

One MFIV and one MFRV and MFRV bypass valve, are located on each MFW line, outside but close to containment. The MFIVs and MFRVs are located upstream of the AFW injection point so that AFW may be supplied to the steam generators following MFIV or MFRV closure. The piping volume from these valves to the steam generators must be accounted for in calculating mass and energy releases, and refilled prior to AFW reaching the steam generator following either an SLB or FWLB.

(continued)

BASES

BACKGROUND (continued)

The MFIVs and MFRVs and MFRV bypass valves, close on receipt of any safety injection (SI) signal, or steam generator (S/G) water level - high high signal. They may also be actuated manually. The MFWP turbine is also tripped upon receipt of an SI or S/G water level - high high signal (as well as other pump related trips), however, these are Class II trips and are only credited as a backup to the single failure of a MFRV and MFRV bypass valve trip. The MFRVs and MFRV bypass valves also close on receipt of a T_{avg} - Low coincident with reactor trip (P-4). In addition to the MFIVs and the MFRVs and MFRV bypass valves, a check valve located upstream of the MFIV is available. The check valve isolates the feedwater line, penetrating containment, and ensures that the intact steam generators do not continue to feed the feedwater line break in the non-safety related piping upstream of the feedwater isolation check valves and that the AFW flow will be to the steam generators.

A description of the MFIVs, MFRVs, and MFRV bypass valves is found in the FSAR, Section 10.4.7 (Ref. 1).

APPLICABLE SAFETY ANALYSES

The design basis of the MFIVs, MFRVs, and MFRV bypass valves is established by the analyses for the large SLB. It is also influenced by the accident analysis for the large FWLB. Closure of the MFRVs and MFRV bypass valves, or tripping of the MFWPs and closure of the MFIVs a short time later, is relied on to terminate an SLB for core and containment response analysis and excess feedwater event upon the receipt of a feedwater isolation signal on high-high steam generator level.

Failure of an MFIV, MFRV, or the MFRV bypass valves to close, or failure of the MFWPs to trip, following an SLB or FWLB can result in additional mass and energy being delivered to the steam generators, contributing to cooldown. This failure also results in additional mass and energy releases following an SLB or FWLB event.

The MFIVs, MFRVs, MFRV bypass valves, and MFWP trip satisfy Criterion 3 of 10 CFR 50.36 (c) (2) (ii).

LCO

This LCO ensures that the MFIVs, MFRVs and MFRV bypass valves, and tripping of the MFWPs, will isolate MFW flow to the steam generators, following an FWLB or main steam line break, or an excessive feedwater event. The MFIVs will also isolate the non-safety related portions from the safety related portions of the system.

(continued)

BASES

LCO (continued)

This LCO requires that four MFIVs, four MFRVs and four MFRV bypass valves be OPERABLE. The MFIVs and MFRVs and MFRV bypass valves are considered OPERABLE when isolation times are within limits and they close on an isolation actuation signal.

This LCO also requires that the MFWP turbine stop valves be OPERABLE. The MFWP turbine stop valves are considered OPERABLE when their closure times are within limit and they close on a feedwater isolation actuation signal.

Failure to meet the LCO requirements can result in additional mass and energy being released to containment following an SLB or FWLB inside containment. A feedwater isolation signal on high steam generator level is relied on to terminate an excess feedwater flow event and failure to meet the LCO may result in the introduction of water into the main steam lines.

APPLICABILITY

The MFIVs, MFRVs, MFRV bypass valves, and the MFWP turbine stop valves must be OPERABLE whenever there is significant mass and energy in the Reactor Coolant System and steam generators. This ensures that, in the event of an HELB, a single failure cannot result in the blowdown of more than one steam generator. In MODES 1, 2, and 3, the MFIVs, MFRVs, MFRV bypass valves, and the MFWP turbine stop valves are required to be OPERABLE to limit the amount of available fluid that could be added to the steam generators in the case of a secondary system pipe break inside containment or an excessive feedwater event. They are not required to be OPERABLE when the MFIVs, MFRVs, and MFRV bypass valves are closed and deactivated or isolated by a closed manual valve, or when the MFWP turbine stop valves are closed and the steam supplies to the MFWP turbine stop valves are isolated, or the MFWP discharge to the steam generators is isolated by a closed manual valve.

When the MFIVs, MFRVs, and MFRV bypass valves are closed and deactivated or isolated by a closed manual valve, they are already performing their safety function. A single MFWP is operated at low power levels. It is placed in service and taken out of service at approximately 2 percent power. Before a MFWP is placed 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 to the steam generators is isolated by a closed manual valve, the safety function of the MFWP turbine stop valves is being performed.

(continued)

BASES

APPLICABILITY (continued)

In MODES 4, 5, and 6, steam generator energy is low. Therefore, the MFIVs, MFRVs, and MFRV bypass valves are normally closed and the MFWPs are tripped since MFW is not required.

ACTIONS

The ACTIONS table is modified by a Note indicating that separate Condition entry is allowed for each valve.

A.1 and A.2

With one MFIV in one or more flow paths inoperable, action must be taken to restore the affected valves to OPERABLE status, or to close or isolate inoperable affected valves within 72 hours. When these valves are closed or isolated, they are performing their required safety function.

The 72 hour Completion Time takes into account the redundancy afforded by the remaining OPERABLE valves and the Class II main feedwater pump trip and the low probability of an event occurring during this time period that would require isolation of the MFW flow paths. The 72 hour Completion Time is reasonable, based on operating experience.

Inoperable MFIVs that are closed or isolated must be verified on a periodic basis that they are closed or isolated. This is necessary to ensure that the assumptions in the safety analysis remain valid. The 7 day Completion Time is reasonable, based on engineering judgment, in view of valve status indications available in the control room, and other administrative controls, to ensure that these valves are closed or isolated.

B.1 and B.2

With one MFRV in one or more flow paths inoperable, action must be taken to restore the affected valves to OPERABLE status, or to close or isolate inoperable affected valves within 72 hours. When these valves are closed or isolated, they are performing their required safety function.

The 72 hour Completion Time takes into account the redundancy afforded by the remaining OPERABLE valves and the Class II main feedwater pump trip and the low probability of an event occurring during this time period that would require isolation of the MFW flow paths. The 72 hour Completion Time is reasonable, based on operating experience.

Inoperable MFRVs, that are closed or isolated, must be verified on a periodic basis that they are closed or isolated. This is necessary to ensure that the assumptions in the safety analysis remain valid. The 7 day Completion Time is reasonable, based on engineering judgment, in view of valve status indications available in the control room, and other administrative controls to ensure that the valves are closed or isolated.

(continued)

BASES

ACTIONS (continued)

C.1 and C.2

With one MFRV bypass valve in one or more flow paths inoperable, action must be taken to restore the affected valves to OPERABLE status, or to close or isolate inoperable affected valves within 72 hours. When these valves are closed or isolated, they are performing their required safety function.

The 72 hour Completion Time takes into account the redundancy afforded by the remaining OPERABLE valves and the Class II main feedwater pump trip and the low probability of an event occurring during this time period that would require isolation of the MFW flow paths. The 72 hour Completion Time is reasonable, based on operating experience.

Inoperable MFRV bypass valves that are closed or isolated must be verified on a periodic basis that they are closed or isolated. This is necessary to ensure that the assumptions in the safety analysis remain valid. The 7 day Completion Time is reasonable, based on engineering judgment, in view of valve status indications available in the control room, and other administrative controls, to ensure that these valves are closed or isolated.

D.1.1, D.1.2, D.1.3, and D.2

When one MFWP turbine stop valve inoperable, action must be taken to restore the affected valve to OPERABLE status or close the affected valve, trip the MFWP, or isolate the MFWP discharge within 72 hours. When the MFWP turbine stop valve is closed, the MFWP is tripped, or the MFWP discharge to the steam generators is isolated, the feedwater isolation safety function is being performed.

The 72 hour Completion Time takes into account the redundancy afforded by the remaining OPERABLE valves and the low probability of an event occurring during this time period that would require termination of MFW flow. The 72 hour Completion Time is reasonable, based on operating experience.

Closure of the MFWP turbine stop valve, trip of the MFWP, or isolation of the MFWP discharge must be verified on a periodic basis to ensure that the assumptions in the safety analysis remain valid. The 7 day Completion Time is reasonable, based on engineering judgment, in view of valve or pump status indicators available in the control room and other administrative controls to ensure that the MFWp turbine stop valve is closed, the MFWP is tripped, or the MFWP discharge is isolated.

(continued)

BASES

ACTIONS (continued)

E.1

With either a MFRV or MFRV bypass valve and MFIV inoperable, or MFWP turbine stop valve (resulting in a loss of MFWP trip function) and MFRV or MFRV bypass valve inoperable, there may be no redundant system to operate automatically and perform the required safety function. Under these conditions, affected valves in each flow path must be restored to OPERABLE status, or the affected flow path isolated within 8 hours. This action returns the system to the condition where at least one valve in each flow path is performing the required safety function. With both a MFWP turbine stop valve and MFIV inoperable, the MFRV and MFRV bypass valve will operate automatically to provide feedwater isolation for the flow path. The 8 hour Completion Time is reasonable, based on operating experience, to complete the actions required to close the MFIV, MFRV, MFRV bypass valve, or MFWP turbine stop valve, or otherwise isolate the affected flow path

F.1 and F.2

If the MFIV(s), MFRV(s) and the MFRV bypass valve(s) cannot be restored to OPERABLE status, or closed, or isolated, or the MFWP turbine stop valve(s) cannot be restored to an OPERABLE status, closed, the MFWP tripped, or the MFWP discharge isolated, within the associated Completion Time, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours, and in MODE 4 within 12 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE REQUIREMENTS

SR 3.7.3.1 and SR 3.7.3.2

These SRs verify that the closure time of each MFIV is ≤ 60 seconds and that each MFRV, and MFRV bypass valves is ≤ 7 seconds, not including the instrument delays. The MFIV and MFRV and MFRV bypass valve closure times are assumed in the accident and containment analyses. These Surveillances are normally performed upon returning the unit to operation following a refueling outage. These valves should not be tested at power since even a part stroke exercise increases the risk of a valve closure with the unit generating power. This is consistent with the ASME Code (Ref. 2) stroke requirements during operation in MODES 1 and 2.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

The Frequency for these SRs is in accordance with the Inservice Testing Program.

SR 3.7.3.3

This SR verifies that each MFIV, MFRV, MFRV bypass valve, and MFWP turbine stop valve can close on an actual or simulated actuation signal. This Surveillance is normally performed upon returning the plant to operation following a refueling outage. The Frequency of MFIV, MFRV, MFRV bypass valve, and MFWP turbine stop valve testing is every 24 months. The 24 month Frequency is based on the refueling cycle. Operating experience has shown that these components are reliable and can be expected to pass the Surveillance when performed at the 24 month Frequency. Therefore, this Frequency is acceptable from a reliability standpoint.

SR 3.7.3.4

This SR verifies that the closure time of each MFWP turbine stop valve is ≤ 1 second, not including the instrument delays. The MFWP turbine stop valve closure times are assumed in the accident and containment analyses. These surveillances are normally performed on returning the unit to operation following a refueling outage. The Frequency is the same as that for the MFRVs and the MFRV bypass valves. Preventive/predictive maintenance related to the MFWP turbine stop valves, and actions initiated in response to control oil cleanliness problems, shall be performed to ensure reliability of MFWP trip function.

REFERENCES

1. FSAR, Section 10.4.7.
2. ANSI/ASME OM-1-1987, (including OM-a-1988 ADDENDA).