Pacific Gas and Electric Company

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PG&E Letter DCL-04-020

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 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 03-19
Revision to Technical Specifications 3.3.3 Post Accident Monitoring (PAM) Instrumentation and 3.6.8 Hydrogen Recombiners

Dear Commissioners and Staff:

License Amendment Request (LAR) 03-19, "Revision to Technical Specifications 3.3.3 Post Accident Monitoring (PAM) Instrumentation and 3.6.8 Hydrogen Recombiners," dated December 30, 2003 (PG&E Letter DCL-03-173), requested deletion of the Technical Specification (TS) requirements related to hydrogen recombiners and hydrogen monitors. The proposed TS changes support implementation of the revisions to 10 CFR 50.44, "Standards for Combustible Gas Control System in Light-Water-Cooled Power Reactors," that became effective October 16, 2003. The LAR was prepared in accordance with the model application noticed for availability in the September 25, 2003, Federal Register (68 FR 55416) as part of the consolidated line item improvement process (CLIIP) and Revision 1 of the NRC-approved Industry/Technical Specification Task Force (TSTF) Standard Technical Specification Change Traveler, TSTF-447, "Elimination of Hydrogen Recombiners and Change to Hydrogen and Oxygen Monitors."

The proposed TS changes reflected in LAR 03-19 included deletion of TS 3.3.3, Condition D, and should have included changes to TS Table 3.3.3-1 and TS 5.6.8, "PAM Report," to reflect the renumbered TS 3.3.3 Conditions. The renumbered conditions were inadvertently not included in the TS Table 3.3.3-1 changes reflected in the LAR, nor to TS 5.6.8. The marked-up TS pages (Enclosure 1) and re-typed TS pages (Enclosure 2) include the required changes, and supersede in their entirety Enclosures 2 and 3 included in PG&E Letter DCL-03-173. The marked-up TS Bases pages (Enclosure 3) were revised to reflect the deletion of plant-specific Surveillance Requirement 3.3.3.3, which is consistent with the TS change, but not reflected in TSTF-447. These marked-up TS Bases pages are included for information only and supersede in its entirety Enclosure 4 included in PG&E Letter DCL-03-173.

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The additional information does not affect the results of the technical and regulatory analyses previously transmitted in PG&E Letter DCL-03-173 or the no significant hazards consideration determination published on September 25, 2003 (68 FR 55416), as part of the CLIIP.

This LAR proposes changes to TS 3.3.3, page 3.3-34, which is also proposed for change in PG&E Letter DCL-03-118, "License Amendment Request 03-13, Application for Technical Specification Change Regarding Mode Change Limitations Using the Consolidated Line Item Improvement Process." If approved prior to approval of this LAR, new TS markups will be provided.

If you have any questions regarding this response, please contact Stan Ketelsen at 805-545-4720.

Sincerely,

James R. Becker
Vice President – Diablo Canyon Operations and Station Director

tcg/4231
Enclosures

cc:	Edgar Bailey, DHS
	Bruce S. Mallett
	David L. Proulx
	Diablo Distribution
cc/enc:	Girija S. Shukla

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

James R. Becker, of lawful age, first being duly sworn upon oath states that he is Vice President – Diablo Canyon Operations and Station Director of Pacific Gas and Electric Company; that he has executed this supplement to License Amendment Request 03-19 on behalf of said company with full power and authority to do so; that he is familiar with the content thereof; and that the facts stated therein are true and correct to the best of his knowledge, information, and belief.

James R. Becker
Vice President – Diablo Canyon Operations and Station Director

Subscribed and sworn to before me this 11th day of March 2004.

Karen T. Mason
Notary Public
County of San Luis Obispo
State of California

KAREN T. MASON
Commission # 1428454
Notary Public - California
San Luis Obispo County
My Comm. Expires Jul 31, 2007

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Commission # 1428454
Notary Public - California
San Luis Obispo County
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PROPOSED TECHNICAL SPECIFICATION CHANGES (MARK-UP)
(This enclosure supersedes Enclosure 2 of DCL 03-173)

3.3 INSTRUMENTATION

3.3.3 Post Accident Monitoring (PAM) Instrumentation

LCO 3.3.3 The PAM instrumentation for each Function in Table 3.3.3-1 shall be OPERABLE.

APPLICABILITY: MODES 1, 2 and 3.

ACTIONS

------------------------------NOTES------------------------------

1. LCO 3.0.4 is not applicable.
2. Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one required channel inoperable.	A.1 Restore required channel to OPERABLE status.	30 days
B. Required Action and associated Completion Time of Condition A not met.	B.1 Initiate action in accordance with Specification 5.6.8.	Immediately
C. ~~-------NOTE-------~~ ~~Not applicable to hydrogen monitor channels.~~ ---------------- One or more Functions with two or more required channels inoperable.	C.1 Restore all but one channel to OPERABLE status.	7 days
~~D. Two hydrogen monitor channels inoperable.~~	~~D.1 Restore one hydrogen monitor channel to OPERABLE status.~~	~~72 hours~~

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
~~E~~D. Required Action and associated Completion Time of Condition C ~~or D~~ not met.	~~E~~D.1	Enter the Condition referenced in Table 3.3.3-1 for the channel.	Immediately
~~F~~E. As required by Required Action ~~E~~D.1 and referenced in Table 3.3.3-1.	~~F~~E.1	Be in MODE 3.	6 hours
	AND		
	~~F~~E.2	Be in MODE 4.	12 hours
F~~G~~. As required by Required Action ~~E~~D.1 and referenced in Table 3.3.3-1.	~~G~~F.1	Initiate action in accordance with Specification 5.6.8.	Immediately

SURVEILLANCE REQUIREMENTS

---NOTE---

SR 3.3.3.1 and SR 3.3.3.2 apply to each PAM instrumentation Function in Table 3.3.3-1.

SURVEILLANCE		FREQUENCY
SR 3.3.3.1	Perform CHANNEL CHECK for each required instrumentation channel that is normally energized.	31 days
SR 3.3.3.2	---------------------------NOTE--------------------------- Neutron detectors are excluded from CHANNEL CALIBRATION. -- Perform CHANNEL CALIBRATION.	24 months
~~SR 3.3.3.3~~	~~Perform CHANNEL CALIBRATION for Hydrogen Monitors~~	~~92 days~~

Table 3.3.3-1 (page 1 of 1)
Post Accident Monitoring Instrumentation

FUNCTION	REQUIRED CHANNELS	CONDITION REFERENCED FROM REQUIRED ACTION ~~E~~D.1
1. Neutron Flux (Wide Range NIS)	2	~~F~~E
2. Steam Line Pressure	2 per steam generator	~~F~~E
3. Reactor Coolant System (RCS) Hot Leg Temperature - T_{hot} (Wide Range)	2	~~F~~E
4. RCS Cold Leg Temperature -T_{cold} (Wide Range)	2	~~F~~E
5. RCS Pressure (Wide Range)	2	~~F~~E
6. Reactor Vessel Water Level Indication System	2	~~G~~F
7. a) Containment Recirculation Sump Water Level (Narrow Range)	2	~~F~~E
b) Containment Reactor Cavity Sump Level-Wide Range	2	~~F~~E
8. a) Containment Pressure (Wide Range)	2	~~F~~E
b) Containment Pressure (Normal Range)	2	~~F~~E
9. Containment Isolation Valve Position	2 per penetration flow path [(a)] [(b)]	~~F~~E
10. Containment Area Radiation (High Range)	2	~~G~~F
11. ~~Hydrogen Monitors~~ Not used	~~2~~	~~F~~
12. Pressurizer Level	2	~~F~~E
13. a) Steam Generator Water Level (Wide Range)	4	~~F~~E
b) Steam Generator Water Level (Narrow Range)	2 per steam generator	~~F~~E
14. Condensate Storage Tank Level	2	~~F~~E
15. Incore Thermocouples - Quadrant 1	2 [(c)]	~~F~~E
16. Incore Thermocouples - Quadrant 2	2 [(c)]	~~F~~E
17. Incore Thermocouples - Quadrant 3	2 [(c)]	~~F~~E
18. Incore Thermocouples - Quadrant 4	2 [(c)]	~~F~~E
19. Auxiliary Feedwater Flow	4	~~F~~E
20. Refueling Water Storage Tank Water Level	2	~~F~~E

(a) Not required for isolation valves whose associated penetration is isolated by at least one closed and deactivated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured.

(b) Only one position indication channel is required for penetration flow paths with only one installed control room indication channel.

(c) A channel consists of two Incore thermocouples.

3.6 CONTAINMENT SYSTEMS

3.6.8 Hydrogen Recombiners - Not used

~~LCO 3.6.8 Two hydrogen recombiners shall be OPERABLE.~~

~~APPLICABILITY: MODES 1 and 2~~

~~ACTIONS~~

~~CONDITION~~	~~REQUIRED ACTION~~	~~COMPLETION TIME~~
~~A. One hydrogen recombiner inoperable.~~	~~A.1 -----NOTE----- LCO 3.0.4 is not applicable. -----~~ ~~Restore hydrogen recombiner to OPERABLE status.~~	~~30 days~~
~~B. Two hydrogen recombiners inoperable.~~	~~B.1 Verify by administrative means that the hydrogen control function is maintained.~~ ~~AND~~ ~~B.2 Restore one hydrogen recombiner to OPERABLE status.~~	~~1 hour~~ ~~AND~~ ~~Once per 12 hours thereafter~~ ~~7 days~~
~~C. Required Action and associated Completion Time not met.~~	~~C.1 Be in MODE 3.~~	~~6 hours~~

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.8.1	Perform a system functional test for each hydrogen recombiner.	24 months
SR 3.6.8.2	Visually examine each hydrogen recombiner enclosure and verify there is no evidence of abnormal conditions.	24 months
SR 3.6.8.3	Perform a resistance to ground test for each heater phase.	24 months

5.6 Reporting Requirements

5.6.6 Reactor Coolant System (RCS) PRESSURE AND TEMPERATURE LIMITS REPORT (PTLR) (continued)

b. The analytical methods used to determine the RCS pressure and temperature limits shall be those previously reviewed and approved by the NRC, specifically those described in the following documents:

1. NRC Letter from NRC to Gregory M. Rueger dated May 28, 1999

2. The analytical methods used to determine the RCS pressure and temperature limits were developed in accordance with:

10 CFR 50, Appendix G and H
Regulatory Guide 1.99, Revision 2
NUREG-0800, Standard Review Plan Section 5.3.2
Branch Technical Position MTEB 5-2
ASME B&PV Code Section III, Appendix G
ASME B&PV Code, Section XI, Appendix A
WCAP-14040-NP-A, Section 2.2

3. LTOP limits (Power Operated Relief Valves (PORV) pressure relief setpoint and LTOP enable temperature) were developed in accordance with:

NUREG-0800, Standard Review Plan Section 5.2.2
Branch Technical Position RSB 5-2
10 CFR 50, Appendix G and H
Regulatory Guide 1.99, Revision 2
Branch Technical Position MTEB 5-2
WCAP-14040-NP-A, Section 2.2

c. The PTLR shall be provided to the NRC upon issuance for each reactor vessel fluence period and for any revision or supplement thereto.

5.6.7 Not Used

5.6.8 PAM Report

When a report is required by Condition B or FG of LCO 3.3.3, "Post Accident Monitoring (PAM) Instrumentation," a report shall be submitted within the following 14 days. The report shall outline the preplanned alternate method of monitoring, the cause of the inoperability, and the plans and schedule for restoring the instrumentation channels of the Function to OPERABLE status.

5.6.9 Not Used

(continued)

PROPOSED TECHNICAL SPECIFICATION PAGES
(This enclosure supersedes Enclosure 3 of DCL-03-173)

Remove Page	Insert Page
3.3-34	3.3-34
3.3-35	3.3-35
3.3-36	3.3-36
3.3-37	3.3-37
3.6-17	3.6-17
3.6-18	---
5.0-28	5.0-28

3.3 INSTRUMENTATION

3.3.3 Post Accident Monitoring (PAM) Instrumentation

LCO 3.3.3 The PAM instrumentation for each Function in Table 3.3.3-1 shall be OPERABLE.

APPLICABILITY: MODES 1, 2 and 3.

ACTIONS

-----NOTES-----
1. LCO 3.0.4 is not applicable.
2. Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one required channel inoperable.	A.1 Restore required channel to OPERABLE status.	30 days
B. Required Action and associated Completion Time of Condition A not met.	B.1 Initiate action in accordance with Specification 5.6.8.	Immediately
C. One or more Functions with two or more required channels inoperable.	C.1 Restore all but one channel to OPERABLE status.	7 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
D. Required Action and associated Completion Time of Condition C not met.	D.1	Enter the Condition referenced in Table 3.3.3-1 for the channel.	Immediately
E. As required by Required Action D.1 and referenced in Table 3.3.3-1.	E.1	Be in MODE 3.	6 hours
	AND		
	E.2	Be in MODE 4.	12 hours
F. As required by Required Action D.1 and referenced in Table 3.3.3-1.	F.1	Initiate action in accordance with Specification 5.6.8.	Immediately

SURVEILLANCE REQUIREMENTS

-----NOTE-----
SR 3.3.3.1 and SR 3.3.3.2 apply to each PAM instrumentation Function in Table 3.3.3-1.

SURVEILLANCE		FREQUENCY
SR 3.3.3.1	Perform CHANNEL CHECK for each required instrumentation channel that is normally energized.	31 days
SR 3.3.3.2	-----NOTE----- Neutron detectors are excluded from CHANNEL CALIBRATION. Perform CHANNEL CALIBRATION.	24 months

Table 3.3.3-1 (page 1 of 1)
Post Accident Monitoring Instrumentation

FUNCTION	REQUIRED CHANNELS	CONDITION REFERENCED FROM REQUIRED ACTION D.1
1. Neutron Flux (Wide Range NIS)	2	E
2. Steam Line Pressure	2 per steam generator	E
3. Reactor Coolant System (RCS) Hot Leg Temperature - T_{hot} (Wide Range)	2	E
4. RCS Cold Leg Temperature -T_{cold} (Wide Range)	2	E
5. RCS Pressure (Wide Range)	2	E
6. Reactor Vessel Water Level Indication System	2	F
7. a) Containment Recirculation Sump Water Level (Narrow Range)	2	E
b) Containment Reactor Cavity Sump Level-Wide Range	2	E
8. a) Containment Pressure (Wide Range)	2	E
b) Containment Pressure (Normal Range)	2	E
9. Containment Isolation Valve Position	2 per penetration flow path [(a) (b)]	E
10. Containment Area Radiation (High Range)	2	F
11. Not used		
12. Pressurizer Level	2	E
13. a) Steam Generator Water Level (Wide Range)	4	E
b) Steam Generator Water Level (Narrow Range)	2 per steam generator	E
14. Condensate Storage Tank Level	2	E
15. Incore Thermocouples - Quadrant 1	2 [(c)]	E
16. Incore Thermocouples - Quadrant 2	2 [(c)]	E
17. Incore Thermocouples - Quadrant 3	2 [(c)]	E
18. Incore Thermocouples - Quadrant 4	2 [(c)]	E
19. Auxiliary Feedwater Flow	4	E
20. Refueling Water Storage Tank Water Level	2	E

(a) Not required for isolation valves whose associated penetration is isolated by at least one closed and deactivated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured.
(b) Only one position indication channel is required for penetration flow paths with only one installed control room indication channel.
(c) A channel consists of two Incore thermocouples.

3.6 CONTAINMENT SYSTEMS

3.6.8 Hydrogen Recombiners - Not used

5.6 Reporting Requirements

5.6.6 Reactor Coolant System (RCS) PRESSURE AND TEMPERATURE LIMITS REPORT (PTLR) (continued)

b. The analytical methods used to determine the RCS pressure and temperature limits shall be those previously reviewed and approved by the NRC, specifically those described in the following documents:

1. NRC Letter from NRC to Gregory M. Rueger dated May 28, 1999

2. The analytical methods used to determine the RCS pressure and temperature limits were developed in accordance with:

   10 CFR 50, Appendix G and H
   Regulatory Guide 1.99, Revision 2
   NUREG-0800, Standard Review Plan Section 5.3.2
   Branch Technical Position MTEB 5-2
   ASME B&PV Code Section III, Appendix G
   ASME B&PV Code, Section XI, Appendix A
   WCAP-14040-NP-A, Section 2.2

3. LTOP limits (Power Operated Relief Valves (PORV) pressure relief setpoint and LTOP enable temperature) were developed in accordance with:

   NUREG-0800, Standard Review Plan Section 5.2.2
   Branch Technical Position RSB 5-2
   10 CFR 50, Appendix G and H
   Regulatory Guide 1.99, Revision 2
   Branch Technical Position MTEB 5-2
   WCAP-14040-NP-A, Section 2.2

c. The PTLR shall be provided to the NRC upon issuance for each reactor vessel fluence period and for any revision or supplement thereto.

5.6.7 Not Used

5.6.8 PAM Report

When a report is required by Condition B or F of LCO 3.3.3, "Post Accident Monitoring (PAM) Instrumentation," a report shall be submitted within the following 14 days. The report shall outline the preplanned alternate method of monitoring, the cause of the inoperability, and the plans and schedule for restoring the instrumentation channels of the Function to OPERABLE status.

5.6.9 Not Used

(continued)

PROPOSED TECHNICAL SPECIFICATION BASES CHANGES (MARKUP)
(This enclosure supersedes Enclosure 4 of DCL-03-173)

BASES

LCO

9. Containment Isolation Valve Position (continued)

of valve position indication to be OPERABLE. This is sufficient to redundantly verify the isolation status of each isolable penetration either via indicated status of the active valve, as applicable, and prior knowledge of a passive valve, or via system boundary status. If a normally active CIV is known to be closed and deactivated, position indication is not needed to determine status. Therefore, the position indication for valves in this state is not required to be OPERABLE. This Function is on a per valve basis and ACTION A is entered separately for each inoperable valve indication. Note (a) to the Required Channels states that the Function is not required for isolation valves whose associated penetration is isolated by at least one closed and deactivated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured.

10. Containment Area Radiation (High Range)

Containment Area Radiation is provided to monitor for the potential of significant radiation releases for use by operators in determining the need to invoke site emergency plans. Containment radiation level is used to determine if a high energy line break (HELB) containing radioactive fluid has occurred, and whether the event is inside or outside of containment.

11. ~~Hydrogen Monitors~~Not used

~~Hydrogen monitoring is provided to detect high hydrogen concentration conditions that represent a potential for containment breach from a hydrogen explosion. This variable is also important in verifying the adequacy of mitigating actions, and is used to determine whether or not hydrogen recombiners should be started.~~

12. Pressurizer Level

Pressurizer Level is used to determine whether to terminate SI, if still in progress, or to reinitiate SI if it has been stopped. Knowledge of pressurizer water level is also used to verify the unit conditions necessary to establish natural circulation in the RCS and to verify that the unit is maintained in a safe shutdown condition.

(continued)

BASES

LCO
(continued)

13. a. Steam Generator Water Level (Wide Range) and

b. Steam Generator Level (Narrow Range)

SG Water Level (Wide Range) is provided to monitor operation of decay heat removal via the SGs. The wide range level covers a span of 12 inches above the lower tubesheet to the steam generator separator. The measured differential pressure is displayed in percent level (cold calibration).

SG Water Level is used to:

- identify the faulted SG following a tube rupture;
- verify that the intact SGs are an adequate heat sink for the reactor;
- determine the nature of the accident in progress (e.g., verify an SGTR); and
- verify unit conditions for termination of SI during secondary unit HELBs outside containment.

Operator action is based on the control room indication of SG level. The RCS response during a design basis small break LOCA depends on the break size. For a certain range of break sizes, the reflux cooling mode of heat transfer is necessary to remove decay heat. Wide range level is a Type A variable because the operator must manually raise and control SG level to establish reflux cooling heat transfer. Operator action is initiated on a loss of subcooled margin. Feedwater flow is increased until the indicated wide range level reaches the reflux cooling initiation point.

There are 4 total required Steam Generator Wide Range Channels with one required on each steam generator. The redundancy of this Function is provided by the presence of 4 Steam Generators.

SG Water Level (Narrow Range) is redundant to the SG wide range level, and provides indication of adequate RCS heat removal capability during normal SG inventory conditions. The narrow range level covers a span from ≥ 437 inches to 581 inches above the lower tubesheet.

There are 3 Steam Generator Narrow Range Channels per steam generator with 2 required for this function.

14. Condensate Storage Tank (CST) Level

CST Level is provided to ensure water supply for auxiliary feedwater (AFW). The CST provides the ensured safety grade water supply for the AFW System. CST Level is displayed on a control room indicator, strip chart recorder, and unit computer.

(continued)

BASES

LCO

14. Condensate Storage Tank (CST) Level (continued)

CST Level is considered a Type A variable because the control room meter is the primary indication used by the operator.

The DBAs that require AFW are the loss of electric power, steam line break (SLB), and small break LOCA.

The CST is the initial source of water for the AFW System. However, as the CST is depleted, manual operator action is necessary to replenish the CST or align suction to the AFW pumps from the Fire Water Storage Tank or other alternate sources.

15, 16, 17, 18. In-Core Thermocouples

In-Core Thermocouples are provided for verification and long term surveillance of core cooling.

An evaluation was made of the minimum number of valid in-core thermocouples necessary for measuring core cooling. The evaluation determined the reduced complement of in-core thermocouple necessary to detect initial core recovery and trend the ensuing core heatup. The evaluations account for core nonuniformities, including incore effects of the radial decay power distribution, excore effects of condensate runback in the hot legs, and nonuniform inlet temperatures. Based on these evaluations, core cooling can be adequately monitored with two valid in-core thermocouple channels per quadrant with two in-core thermocouples per required channel. Core Exit Temperature is used to determine whether to terminate SI, if still in progress, or to reinitiate SI if it has been stopped. Core Exit Temperature is also used for unit stabilization and cooldown control.

Two OPERABLE channels of In-Core Thermocouples are required in each quadrant to provide indication of radial distribution of the coolant temperature rise across representative regions of the core. Power distribution symmetry was considered in determining the specific number and locations provided for diagnosis of local core problems. Therefore, two randomly selected thermocouples are not sufficient to meet the two thermocouples per channel requirement in any quadrant. The two thermocouples in each channel must meet the additional requirement that one is located near the center of the core and the other near the core perimeter, such that the pair of Core Exit Temperatures indicate the radial temperature gradient across their core quadrant. Unit specific evaluations in response to Item II.F.2 of NUREG-0737 (Ref. 3) should have identified the thermocouple pairings that satisfy these requirements. Two sets of two thermocouples ensure a single failure will not disable the ability to determine the radial temperature gradient.

(continued)

BASES

LCO (continued)

19. Auxiliary Feedwater (AFW) Flow

AFW Flow is provided to monitor operation of decay heat removal via the SGs. One AFW flow channel is provided for each steam generator.

The AFW Flow to each SG is determined from a differential pressure measurement calibrated for a range of 0 gpm to 300 gpm. Each differential pressure transmitter provides an input to a control room indicator and the unit computer. Since the primary indication used by the operator during an accident is the control room indicator, the PAM specification deals specifically with this portion of the instrument channel.

AFW flow is used three ways:

- to verify delivery of AFW flow to the SGs;
- to determine whether to terminate SI if still in progress, in conjunction with SG water level (narrow range); and
- to regulate AFW flow so that the SG tubes remain covered.

AFW flow is a Type A variable because operator action is required to throttle flow during an SLB accident to prevent the AFW pumps from operating in runout conditions. AFW flow is also used by the operator to verify that the AFW System is delivering the correct flow to each SG. However, the primary indication used by the operator to ensure an adequate inventory is SG level (Narrow Range) during normal SG inventory conditions.

20. Refueling Water Storage Tank (RWST) Water Level

RWST water level is used to verify the water source availability to the emergency core cooling system (ECCS) and Containment Spray Systems. It may also provide an indication of time for initiating cold leg recirculation from the sump following a LOCA. The RWST level channel additionally trips the Residual Heat Removal Pumps in preparation for transfer to cold leg recirculation.

APPLICABILITY

The PAM instrumentation LCO is applicable in MODES 1, 2, and 3. These variables are related to the diagnosis and pre-planned actions required to mitigate DBAs. The applicable DBAs are assumed to occur in MODES 1, 2, and 3. In MODES 4, 5, and 6, unit conditions are such that the likelihood of an event that would require PAM instrumentation is low; therefore, the PAM instrumentation is not required to be OPERABLE in these MODES.

(continued)

BASES (continued)

ACTIONS

Note 1 has been added in the ACTIONS to exclude the MODE change restriction of LCO 3.0.4. This exception allows entry into the applicable MODE while relying on the ACTIONS even though the ACTIONS may eventually require unit shutdown. This exception is acceptable due to the passive function of the instruments, the operator's ability to respond to an accident using alternate instruments and methods, and the low probability of an event requiring these instruments.

Note 2 has been added in the ACTIONS to clarify the application of Completion Time rules. The Conditions of this Specification may be entered independently for each Function listed on Table 3.3.3-1. When the required channels in Table 3.3.3-1 are specified on a per steam generator basis, then the Condition may be entered separately for each steam generator.

The Completion Time(s) of the inoperable channel(s) of a Function will be tracked separately for each Function starting from the time the Condition was entered for that Function.

A.1

Condition A applies when one or more Functions have one required channel that is inoperable. Required Action A.1 requires restoring the inoperable channel to OPERABLE status within 30 days. The 30 day Completion Time is based on operating experience and takes into account the remaining OPERABLE channel (or in the case of a Function that has only one required channel, other non-Regulatory Guide 1.97 instrument channels to monitor the Function), the passive nature of the instrument (no critical automatic action is assumed to occur from these instruments), and the low probability of an event requiring PAM instrumentation during this interval.

B.1

Condition B applies when the Required Action and associated Completion Time for Condition A are not met. This Required Action specifies immediate initiation of actions in Specification 5.6.8, which requires a written report to be submitted to the NRC. This report discusses the results of the root cause evaluation of the inoperability and identifies proposed restorative actions. This action is appropriate in lieu of a shutdown requirement since alternative actions are identified before loss of functional capability, and given the likelihood of unit conditions that would require information provided by this instrumentation.

(continued)

BASES

ACTIONS (continued)

C.1

Condition C applies when one or more Functions have two or more inoperable required channels (i.e., two or more channels inoperable in the same function). Required Action C.1 requires restoring all but one channel in the Function(s) to OPERABLE status within 7 days. The Completion Time of 7 days is based on the relatively low probability of an event requiring PAM instrument operation and the availability of alternate means to obtain the required information. Continuous operation with no required channels OPERABLE in a Function is not acceptable because the alternate indications may not fully meet all performance qualification requirements applied to the PAM instrumentation. Therefore, requiring restoration of all but one inoperable channel of the Function limits the risk that the PAM Function will be in a degraded condition should an accident occur. ~~Condition C is modified by a Note that excludes hydrogen monitor channels.~~

~~D.1~~

~~Condition D applies when two hydrogen monitor channels are inoperable. Required Action D.1 requires restoring one hydrogen monitor channel to OPERABLE status within 72 hours. The 72 hour Completion Time is reasonable based on the unlikely event that a LOCA (which would cause core damage) would occur during this time.~~

~~E~~D.1

Condition ~~E~~ D applies when the Required Action and associated Completion Time of Condition C ~~or D are~~is not met. Required Action ~~E~~D.1 requires entering the appropriate Condition referenced in Table 3.3.3-1 for the channel immediately. The applicable Condition referenced in the Table is Function dependent. Each time an inoperable channel has not met the~~any~~ Required Action of Condition C ~~or D~~, and the associated Completion Time has expired, Condition ~~E~~ D is entered for that channel and provides for transfer to the appropriate subsequent Condition.

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

If the Required Action and associated Completion Time of Condition~~s~~ C ~~or D are~~is not met and Table 3.3.3-1 directs entry into Condition ~~F~~E, the unit must be brought to a MODE where the requirements of this LCO do not apply. To achieve this status, the unit must be brought to at least MODE 3 within 6 hours and MODE 4 within 12 hours.

(continued)

BASES

ACTIONS

~~F~~E.1 and ~~F~~E.2 (continued)

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.

~~G~~F.1

Alternate means of monitoring Reactor Vessel Water Level and Containment Area Radiation have been developed. These alternate means may be temporarily installed if the normal PAM channel cannot be restored to OPERABLE status within the allotted time. Monitoring the Core Exit Thermocouples, Pressurizer Level indication (07-LI-459A, 460A or 461), and RCS Subcooling Monitor indication (07-YI-31) provide an alternate means for RVLIS. These three parameters provide diverse information to verify there is adequate core cooling or RCS inventory. When Containment Area Radiation Level (High Range) monitors (R-30 and R-31) are inoperable, selected portable radiation monitoring equipment is made available for taking correlated readings at the equipment or personnel hatches as the alternate method. If these alternate means are used, the Required Action is not to shut down the unit but rather to follow the directions of Specification 5.6.8, in the Administrative Controls section of the TS. The report provided to the NRC should discuss the alternate means used, describe the degree to which the alternate means are equivalent to the installed PAM channels, justify the areas in which they are not equivalent, and provide a schedule for restoring the normal PAM channels.

SURVEILLANCE REQUIREMENTS

A Note has been added to the SR Table to clarify that SR 3.3.3.1 and SR 3.3.3.2 apply to each PAM instrumentation Function in Table 3.3.3-1.

SR 3.3.3.1

Performance of the CHANNEL CHECK once every 31 days ensures that a gross instrumentation failure has not occurred. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between the two instrument channels could be an indication of excessive instrument drift in one of the channels or of something even more serious. A CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying the instrumentation continues to operate properly between each CHANNEL CALIBRATION. The high radiation instrumentation should be compared to similar unit instruments located throughout the unit.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.3.1 (continued)

Agreement criteria are determined by the unit staff, based on a combination of the channel instrument uncertainties, including isolation, indication, and readability. If a channel is outside the criteria, it may be an indication that the sensor or the signal processing equipment has drifted outside its limit. If the channels are within the criteria, it is an indication that the channels are OPERABLE.

As specified in the SR, a CHANNEL CHECK is only required for those channels that are normally energized. The Containment Hydrogen Concentration monitors are maintained in a "standby" condition which does not energize all of the monitor components, thus the monitors are not considered "normally energized."

The Frequency of 31 days is based on operating experience that demonstrates that channel failure is rare. The CHANNEL CHECK supplements less formal, but more frequent, checks of channels during normal operational use of the displays associated with the LCO required channels.

SR 3.3.3.2

A CHANNEL CALIBRATION is performed every 24 months, or approximately at every refueling. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor. The test verifies that the channel responds to measured parameter with the necessary range and accuracy. CHANNEL CALIBRATION of the Neutron Flux Wide Range Function excludes the detectors. To ensure that the detectors are verified, the Neutron Flux Wide Range Channels are cross-correlated and normalized to reactor thermal power. CHANNEL CALIBRATION of the Containment Radiation Level (High Range) Function may consist of an electronic calibration of the channel, not including the detector, for range decades above 10R/h and a one point calibration check of the detector below 10 R/h with an installed or portable gamma source. Whenever an RTD is replaced in Functions 3 or 4, the next required CHANNEL CALIBRATION of the RTDs is accomplished by an inplace cross calibration that compares the other sensing elements with the recently installed sensing element. Whenever an incore thermocouple is replaced in Function 15, 16, 17, or 18 the next required CHANNEL CALIBRATION of the incore thermocouples is accomplished by an inplace cross calibration that compares the other sensing elements with the recently installed sensing element. For function 9, Containment Isolation Valve Position, the instrument loop consists of the position switch mounted on the valve, the indication lights in the monitor boxes and the interconnecting wiring. For the CHANNEL CALIBRATION to verify that the channel

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.3.2 (continued)

responds with the necessary range and accuracy, the test must verify that the proper indication is received when the valve is stroked to the fully closed position. Verification of intermediate position or actual percentage closed is not required, however, for OPERABILITY, the position indication must be able to communicate the proper isolation status of the containment penetration. Adjustments to the channel may be done as part of this surveillance or through other controlled instructions. The Frequency is based on operating experience and consistency with the typical industry refueling cycle.

~~SR 3.3.3.3~~

~~A CHANNEL CALIBRATION is performed every 92 days. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor. The test verifies that the channel responds to measured parameters with the necessary range and accuracy. The calibration sequence uses a zero and span sample gas in accordance with the manufacturer's recommendations. The Frequency is based on the manufacturer's recommendations and on operating experience.~~

REFERENCES

1. FSAR, 7.5.
2. Regulatory Guide 1.97, Revision 3.
3. NUREG-0737, Supplement 1, "TMI Action Items."
4. Supplemental Safety Evaluation Report 14.
5. Supplemental Safety Evaluation Report 31.

B 3.6 CONTAINMENT SYSTEMS

B 3.6.8 Hydrogen RecombinersNot used

BASES

BACKGROUND	The function of the hydrogen recombiners is to eliminate the potential breach of containment due to a hydrogen-oxygen reaction. Per 10 CFR 50.44, "Standards for Combustible Gas Control Systems in Light-Water-Cooled Reactors" (Ref. 1), and GDC 41, "Containment Atmosphere Cleanup" (Ref. 2), hydrogen recombiners are required to reduce the hydrogen concentration in the containment following a loss of coolant accident (LOCA) or steam line break (SLB). The recombiners accomplish this by recombining hydrogen and oxygen to form water vapor. The vapor remains in containment, thus eliminating any discharge to the environment. The hydrogen recombiners are manually initiated since flammable limits would not be reached until several days after a Design Basis Accident (DBA). Two 100% capacity independent hydrogen recombiner systems are provided. Each consists of controls located in the control room, a power supply and a recombiner. Recombination is accomplished by heating a hydrogen-air mixture above 1150°F. A single recombiner is capable of maintaining the hydrogen concentration in containment below the 4.0 volume percent (v/o) flammability limit. Two recombiners are provided to meet the requirement for redundancy and independence. Each recombiner is powered from a separate Engineered Safety Features bus, and is provided with a separate power panel and control panel.
APPLICABLE SAFETY ANALYSES	The hydrogen recombiners provide for the capability of controlling the bulk hydrogen concentration in containment to less than the lower flammable concentration of 4.0 v/o following a DBA. This control would prevent a containment wide hydrogen burn, thus ensuring the pressure and temperature assumed in the analyses are not exceeded. The limiting DBA relative to hydrogen generation is a LOCA. Hydrogen may accumulate in containment following a LOCA as a result of: a. A metal steam reaction between the zirconium fuel rod cladding and the reactor coolant; b. Radiolytic decomposition of water in the Reactor Coolant System (RCS) and the containment sump; c. Hydrogen in the RCS at the time of the LOCA (i.e., hydrogen dissolved in the reactor coolant and hydrogen gas in the pressurizer vapor space); or

(continued)

BASES

APPLICABLE SAFETY ANALYSIS (continued)

d. Corrosion of metals exposed to containment spray and Emergency Core Cooling System solutions.

To evaluate the potential for hydrogen accumulation in containment following a LOCA, the hydrogen generation as a function of time following the initiation of the accident is calculated. Conservative assumptions recommended by Reference 4 are used to maximize the amount of hydrogen calculated.

Based on the conservative assumptions used to calculate the hydrogen concentration versus time after a LOCA, the hydrogen concentration in the primary containment would reach 3.5 v/o after 3 days after the LOCA and 4.0 v/o about 2 days later if no recombiner was functioning (Ref. 3). Initiating the hydrogen recombiners when the primary containment hydrogen concentration reaches 3.5 v/o will maintain the hydrogen concentration in the primary containment below flammability limits.

The hydrogen recombiners are designed such that, with the conservatively calculated hydrogen generation rates discussed above, a single recombiner is capable of limiting the peak hydrogen concentration in containment to less than 4.0 v/o (Ref. 3). The Hydrogen Purge System is designed and constructed such that it is Design Class I (for Quality and electrical power) but not redundant. As such, it is an adequate backup to the redundant hydrogen recombiners since it would be relied upon only in the event of a non-design basis condition.

The hydrogen recombiners satisfy Criterion 3 of 10CFR50.36(c)(2)(ii).

LCO

Two hydrogen recombiners must be OPERABLE. This ensures operation of at least one hydrogen recombiner in the event of a worst case single active failure.

Operation with at least one hydrogen recombiner ensures that the post LOCA hydrogen concentration can be prevented from exceeding the flammability limit.

APPLICABILITY

In MODES 1 and 2, two hydrogen recombiners are required to control the hydrogen concentration within containment below its flammability limit of 4.0 v/o following a LOCA, assuming a worst case single failure.

In MODES 3 and 4, both the hydrogen production rate and the total hydrogen produced after a LOCA would be less than that calculated for the DBA LOCA. Also, because of the limited time in these MODES, the probability of an accident requiring the hydrogen recombiners is low. Therefore, the hydrogen recombiners are not required in MODE 3 or 4.

(continued)

BASES

APPLICABILITY (continued)	In MODES 5 and 6, the probability and consequences of a LOCA are low, due to the pressure and temperature limitations in these MODES. Therefore, hydrogen recombiners are not required in these MODES.

ACTIONS

A.1

With one containment hydrogen recombiner inoperable, the inoperable recombiner must be restored to OPERABLE status within 30 days. In this condition, the remaining OPERABLE hydrogen recombiner is adequate to perform the hydrogen control function. However, the overall reliability is reduced because a single failure in the OPERABLE recombiner could result in reduced hydrogen control capability. The 30 day Completion Time is based on the availability of the other hydrogen recombiner, the small probability of a LOCA or SLB occurring (that would generate an amount of hydrogen that exceeds the flammability limit), and the amount of time available after a LOCA or SLB (should one occur) for operator action to prevent hydrogen accumulation from exceeding the flammability limit.

Required Action A.1 has been modified by a Note that states the provisions of LCO 3.0.4 are not applicable. As a result, a MODE change is allowed when one recombiner is inoperable. This allowance is based on the availability of the other hydrogen recombiner, the small probability of a LOCA or SLB occurring (that would generate an amount of hydrogen that exceeds the flammability limit), and the amount of time available after a LOCA or SLB (should one occur) for operator action to prevent hydrogen accumulation from exceeding the flammability limit.

B.1 and B.2

With two hydrogen recombiners inoperable, the ability to perform the hydrogen control function via alternate capabilities must be verified by administrative means within 1 hour. The alternate hydrogen control capabilities are provided by the containment Hydrogen Purge System. The 1 hour Completion Time allows a reasonable period of time to verify that a loss of hydrogen control function does not exist. In addition, the alternate hydrogen control system capability must be verified once per 12 hours thereafter to ensure its continued availability. Both the initial verification and all subsequent verifications may be performed as an administrative check by examining logs or other information to determine the availability of the key locked alternate hydrogen control system. It does not mean to perform the Surveillances are needed to demonstrate OPERABILITY of the alternate hydrogen control system. If the ability to perform the

(continued)

BASES

ACTIONS	B.1 and B.2 (continued) hydrogen control function is maintained, continued operation is permitted with two hydrogen recombiners inoperable for up to 7 days. Seven days is a reasonable time to allow two hydrogen recombiners to be inoperable because the hydrogen control function is maintained and because of the low probability of the occurrence of a LOCA that would generate hydrogen in the amounts capable of exceeding the flammability limit. C.1 If the inoperable hydrogen recombiner(s) cannot be restored to OPERABLE status within the required Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours. The Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging plant systems.
SURVEILLANCE REQUIREMENTS	SR 3.6.8.1 Performance of a system functional test for each hydrogen recombiner ensures the recombiners are operational and can attain and sustain the temperature necessary for hydrogen recombination. In particular, this SR verifies that the minimum heater sheath temperature increases to ≥ 700°F in ≤ 90 minutes. After reaching 700°F, the power is increased to maximum power for approximately 2 minutes and power is verified to be ≥ 60 kW. Operating experience has shown that these components usually pass the Surveillance when performed at the 24 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint. SR 3.6.8.2 This SR ensures there are no physical problems that could affect recombiner operation. Since the recombiners are mechanically passive, they are not subject to mechanical failure. The only credible failure involves loss of power, blockage of the internal flow, missile impact, etc.

(continued)

BASES

SURVEILLANCE REQUIREMENTS	SR 3.6.8.2 (continued) A visual inspection is sufficient to determine abnormal conditions that could cause such failures (i.e., loose wiring or structural connections, deposits of foreign material, etc.). The 24 month Frequency for this SR was developed considering the incidence of hydrogen recombiners failing the SR in the past is low. SR 3.6.8.3 This SR, which is performed following the functional test of SR 3.6.8.1, requires performance of a resistance to ground test for each heater phase to ensure that there are no detectable grounds in any heater phase. This is accomplished by verifying that the resistance to ground for any heater phase is ≥ 10,000 ohms. The 24 month Frequency for this Surveillance was developed considering the incidence of hydrogen recombiners failing the SR in the past is low.
REFERENCES	1. 10 CFR 50.44. 2. 10 CFR 50, Appendix A, GDC 41. 3. FSAR Section 6.2.5. 4. Regulatory Guide 1.7, Revision 2.