Pacific Gas and Electric Company®

James R. Becker
Site Vice President

Diablo Canyon Power Plant
Mail Code 104/5/601
P. O. Box 56
Avila Beach, CA 93424

805.545.3462
Internal: 691.3462
Fax: 805.545.6445

April 9, 2010

PG&E Letter DCL-10-036

10 CFR 50.90

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
Response to NRC Request for Additional Information Regarding License Amendment Request 09-02, "Revision to Technical Specification 3.4.15, 'RCS Leakage Detection Instrumentation,' Operability Requirements and Actions for RCS Leakage Detection Instrumentation"

Reference: 1. PG&E Letter DCL-09-49, "License Amendment Request 09-02, Revision to Technical Specification 3.4.15, 'RCS Leakage Detection Instrumentation,' Operability Requirements and Actions for RCS Leakage Detection Instrumentation," dated July 3, 2009.

Dear Commissioners and Staff:

In Reference 1, Pacific Gas and Electric (PG&E) submitted License Amendment Request (LAR) 09-02, "Revision to Technical Specification 3.4.15, 'RCS Leakage Detection Instrumentation,' Operability Requirements and Actions for RCS Leakage Detection Instrumentation." The LAR 09-02 proposed changes would revise the Operating Licenses to revise Technical Specification (TS) 3.4.15 to add a new Condition for any containment sump monitor, the containment atmosphere particulate radioactivity monitor, and the containment fan cooler unit (CFCU) condensate collection monitor inoperable, to revise the TS 3.4.15 Condition for all required monitors inoperable, and to remove the word "required" from TS 3.4.15 Condition A, Required Action A.2, Condition B, and Required Action B.2. The LAR 09-02 proposed changes would revise TS 3.4.15 Condition A to apply to any containment sump monitor, and would revise the name of the CFCU condensate collection monitor in the TS 3.4.15 Actions. The LAR 09-02 proposed changes would also revise the TS 3.4.15 Bases to eliminate discussion of information that could be erroneously interpreted as Operability requirements from all sections except the Limiting Condition for Operation Section, to describe the required response time of the instruments, to revise the basis for OPERABILITY for the containment sump monitors, containment atmosphere particulate radioactivity monitor, containment atmosphere gaseous radioactivity monitor, and the CFCU condensate collection monitor, and to add the basis for the new and revised TS 3.4.15 Conditions.

A001
NRR

On March 3, 2010, the NRC staff requested additional information required to complete the review of LAR 09-02. PG&E's responses to the staff's questions are provided in Attachment 1 of the Enclosure. Attachment 2 of the Enclosure provides revised marked-up TS Bases pages. Attachment 2 of the Enclosure supersedes Attachment 3 of the Enclosure of Reference 1 in its entirety.

This information does not affect the results of the technical evaluation or the no significant hazards consideration determination previously transmitted in Reference 1.

PG&E makes no regulatory commitments (as defined by NEI 99-04) in this letter. This letter includes no revisions to existing regulatory commitments.

If you have any questions, or require additional information, please contact Tom Baldwin at (805) 545-4720.

I state under penalty of perjury that the foregoing is true and correct.

Executed on April 9, 2010.

Sincerely,

James R. Becker
Site Vice President

kjse/4328 50304279
Enclosure
cc: Gary W. Butner, Acting Branch Chief, California Department of Public Health
Elmo E. Collins, NRC Region IV
Michael S. Peck, NRC, Senior Resident Inspector
Diablo Distribution
cc/enc: Alan B. Wang, Project Manager, Office of Nuclear Reactor Regulation

PG&E Response to NRC Request for Additional Information Regarding License Amendment Request 09-02, "Revision to Technical Specification 3.4.15, 'RCS Leakage Detection Instrumentation,' Operability Requirements and Actions for RCS Leakage Detection Instrumentation"

NRC Question 1:

Background: Position C.7 of Regulatory Guide 1.45, Rev 0 (RG 1.45) recommends "indicators and alarms for each leakage detection system ... be provided in the main control room." The current DCPP Technical Specifications (TS) 3.4.15 Bases states, "The need to evaluate the severity of an alarm or an indication is important to operators".

Issue: The revised TS 3.4.15 Bases section for RCS Leakage Detection Instrumentation removes the control room alarms from the TS Bases discussion. The proposed change adds the wording, "OPERABILITY of the RCS leakage detection instrumentation includes the control room indication associated with the instrumentation but does not include control room alarms or alarm setpoints." The removal of the control room alarms from the TS Bases discussion is a departure from the standard technical specifications. Allowing operation without functional alarms on RCS leakage detection instrumentation could extend the amount of time for control room operators to become aware of an increase in containment radioactivity.

Request: Retain the discussion of alarms in the TS Bases discussion or provide justification for their removal. Include a discussion of the reason for removing the control room alarms and setpoints from TS operability discussion, the benefit obtained by making this change, and the program that would maintain control of these alarms and setpoints once removed from TS.

PG&E Response:

The discussion of the alarms will be retained in the TS Bases for Surveillance Requirement 3.4.15.2 and new statements will be added to discuss the alarms for the containment atmosphere gaseous and particulate radioactivity monitors in the TS Bases Background and Applicable Safety Analyses sections. The revisions to the TS Bases are contained in Attachment 2 of this Enclosure.

The settings for the alarms for the containment atmosphere gaseous and particulate radioactivity monitors for TS 3.4.15 are not design setpoints for Diablo Canyon Power Plant (DCPP). The alarms and trip setpoints for radiation monitoring instrumentation for plant operations were described in Table 3.3-6 of the initial DCPP Units 1 and 2 combined TS contained in NUREG-1151, "Technical Specifications Diablo Canyon Power Plant, Units 1 and 2," dated August, 1985. The alarm and trip setpoints for the containment gaseous monitor for Reactor Coolant System (RCS) leakage and

containment particulate monitor for RCS leakage were identified as "N.A." in NUREG-1151 Table 3.3-6. A copy of NUREG-1151 Table 3.3-6 is contained in Attachment 1 of this Enclosure.

However, there are alarm settings for the containment atmosphere gaseous and particulate radioactivity monitors that are administratively controlled as discussed in the Response to Question 2.

NRC Question 2:

Background: Per DCPP Final Safety Analysis Report (FSAR) section 11.4.4.1, "Alarm Setpoints", alarm setpoints for process and area radiation monitors are "based on protection of public health and safety, plant personnel health and safety, and maintaining efficient plant operation."

Issue: The sensitivity of the containment atmosphere gaseous radioactivity monitor is limited by low RCS activity, but the instrument is still a valuable tool for RCS leakage detection. In order to meet statement of FSAR section 11.4.4.1 above, the alarm setpoints should be as conservative as is reasonable to detect leakage at current RCS activity levels.

Request: Describe how the alarm setpoints for the containment gaseous radioactivity monitor will be determined for operation under the normal, low RCS activity level.

PG&E Response:

Alarm setting for the containment atmosphere gaseous and particulate radioactivity monitors are currently administratively set to provide a sensitive response at a low count rate above background such that spurious alarms are not excessive. This is consistent with the proposed TS Bases contained in Attachment 2 of the Enclosure (see Insert 1 of the TS Bases Inserts).

Table 3.3-6
NUREG-1151, "Technical Specifications Diablo Canyon Power Plant, Units 1 and 2," dated August, 1985

TABLE 3.3-6

RADIATION MONITORING INSTRUMENTATION FOR PLANT OPERATIONS

INSTRUMENT	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ALARM/TRIP SETPOINT	ACTION
1. Fuel Storage Area				
a. Spent Fuel Pool	1	*	≤ 15 mR/hr	30 & 32**
b. New Fuel Storage	1	*	≤ 15 mR/hr	30 & 32**
2. Control Room Ventilation Mode Change	2***	All	≤ 2 mR/hr	34
3. Containment				
a. Gaseous Activity				
1) Containment Ventilation Isolation (RM-14A or 14B)	1	6	Per Specification 3.3.3.10	33
2) RCS Leakage	1	1, 2, 3, 4	N.A.	31
b. Particulate Activity				
RCS Leakage	1	1, 2, 3, 4	N.A.	31

*With fuel in the spent fuel pool or new fuel storage vault.
**With irradiated fuel in the spent fuel pool.
***One channel for each normal intake to the Control Room Ventilation System (common to both units).

Enclosure
Attachment 2
PG&E Letter DCL-10-036

Changes to Technical Specification Bases Pages

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.15 RCS Leakage Detection Instrumentation

BASES

BACKGROUND

GDC 30 of Appendix A to 10 CFR 50 (Ref. 1) requires means for detecting and, to the extent practical, identifying the location of the source of RCS LEAKAGE. Regulatory Guide 1.45, Revision 0, (Ref. 2) describes acceptable methods for selecting leakage detection systems.

Leakage detection systems must have the capability to detect significant reactor coolant pressure boundary (RCPB) degradation as soon after occurrence as practical to minimize the potential for propagation to a gross failure. Thus, an early indication or warning signal is necessary to permit proper evaluation of all unidentified LEAKAGE.

~~Industry practice has shown that water flow changes of 0.5 to 1.0 gpm can be readily detected in contained volumes by monitoring changes in water level, in flow rate, or in the operating frequency of a pump.~~ The containment sumps used to collect unidentified LEAKAGE and the containment fan cooling unit (CFCU) condensate collection monitors are capable of detecting increases ~~of 0.5 to 1.0 gpm in~~ above the normal flow rates. ~~This sensitivity is acceptable for detecting increases in unidentified LEAKAGE.~~

Each CFCU has an individual condensate collection monitor. The condensate from the cooling coils passes out from the CFCU to a containment sump. The condensate collection system design does not use an on-line flow monitor. The condensate drain flow can be collected, measured, and then using the elapsed time of the collection, the average flow rate can be determined. This monitoring can be done from the control room. Although multiple CFCUs may be operating, any individual CFCU condensate monitor may be employed to provide indication of the condensate flow rate.

The reactor coolant contains radioactivity that, when released to the containment, ~~can~~ may be detected by radiation monitoring instrumentation. ~~Reactor coolant radioactivity levels will be low during initial reactor startup and for a few weeks thereafter, until activated corrosion products have been formed and fission products appear from fuel element cladding contamination or cladding defects. Instrument sensitivities of 10^{-9} μCi/cc radioactivity for particulate monitoring and of 10^{-6} μCi/cc radioactivity for gaseous monitoring are practical for these leakage detection systems.~~ Radioactivity detection systems are included for monitoring both particulate and gaseous activities because of their sensitivities and rapid responses to RCS LEAKAGE.

Insert 1

(continued)

BASES

BACKGROUND (continued)

Other indications may be used to detect an increase in unidentified LEAKAGE; however, they are not required to be OPERABLE by this LCO. Air temperature and pressure monitoring methods may also be used to infer unidentified LEAKAGE to the containment. Containment temperature and pressure fluctuate slightly during plant operation, but a rise above the normally indicated range of values may indicate RCS leakage into the containment. The relevance of temperature and pressure measurements ~~are~~ is affected by containment free volume and, for temperature, detector location. Alarm signals from temperature and pressure ~~these~~ instruments can be valuable in recognizing rapid and sizable leakage to the containment. Temperature and pressure monitors are not required by this LCO.

The above-mentioned LEAKAGE detection methods or systems differ in sensitivity and response time based on factors including leak location, RCS temperature, and RCS activity.

Insert 2

APPLICABLE SAFETY ANALYSES

The asymmetric loads produced by postulated breaks are the result of assumed pressure imbalance, both internal and external to the RCS. The internal asymmetric loads result from a rapid decompression that causes large transient pressure differentials across the core barrel and fuel assemblies. The external asymmetric loads result from the rapid depressurization of the annulus regions, such as the annulus between the reactor vessel and the shield wall, and cause large transient pressure differentials to act on the vessel. These differential pressure loads could damage RCS supports, core cooling equipment or core internals. This concern was first identified as Multiplant Action (MPA) D-10 and subsequently as Unresolved Safety Issue (USI) 2, "Asymmetric LOCA Loads" (Ref. 4).

The resolution of USI-2 for Westinghouse PWRs was the use of fracture mechanics technology for RCS piping > 10 inches diameter. (Ref. 5). This technology became known as leak before-break (LBB). Included within the LBB methodology was the requirement to have leak detection systems capable of detecting a 1.0 gpm leak within four hours. This leakage rate is designed to ensure that adequate margins exist to detect leaks in a timely manner during normal operating conditions. The use of the LBB methodology is described in Reference 6.

Insert 3

The need to evaluate the severity of an ~~alarm or an~~ indication is important to the operators, and the ability to compare and verify with indications from other systems is necessary. ~~The system response times and sensitivities are described in the FSAR (Ref. 3).~~

The safety significance of RCS LEAKAGE varies widely depending on its source, rate, and duration. Therefore, detecting and monitoring RCS LEAKAGE into the containment area is necessary.

Quickly separating the identified LEAKAGE from the unidentified LEAKAGE provides quantitative information to the operators, allowing

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)	them to take corrective action should a leak occur that could be detrimental to the safety of the unit and the public. RCS leakage detection instrumentation satisfies Criterion 1 of 10 CFR 50.36(c)(2)(ii).
LCO	~~One method of protecting against large RCS LEAKAGE derives from the ability of instruments to rapidly detect extremely small leaks.~~ This LCO requires instruments of diverse monitoring principles to be OPERABLE to provide ~~a high degree of~~ confidence that small amounts of unidentified LEAKAGE ~~extremely small leaks~~ are detected in time to allow actions to place the plant in a safe condition when RCS LEAKAGE indicates possible RCPB degradation. The LCO requires three instruments to be OPERABLE. OPERABILITY of the containment sump monitor systems, the particulate radioactivity monitor, the gaseous radioactivity monitor, and the CFCU condensate collection monitor is based on the capability to indicate a 1 gpm leak rate within four hours. This allowable response time is based on the LBB methodology criterion for leakage detection systems, for plants with leakage detection systems that did not meet all of the provisions of Regulatory Guide 1.45, that at least one leakage detection system with sensitivity capable of detecting an unidentified leakage rate of one gpm in four hours should be operable (References 5 and 7). The containment structure sumps and reactor cavity sump are used to collect unidentified LEAKAGE. The containment structure sumps and the reactor cavity sump have associated sump level and sump pump integrated flow monitors that are visually monitored to detect when there is an increase in LEAKAGE above the normal value. The identification of an increase in unidentified LEAKAGE will be delayed by the time required for the unidentified LEAKAGE to travel to the sumps and it may take longer than one hour to detect a 1 gpm increase in unidentified LEAKAGE, depending on the origin and magnitude of the LEAKAGE. This sensitivity is acceptable for containment sump monitor OPERABILITY. The reactor coolant contains radioactivity that, when released to the containment, may be detected by the gaseous or particulate containment atmosphere radioactivity monitor. Radioactivity detection systems are included for monitoring both particulate and gaseous activities because of their sensitivities and rapid responses to RCS LEAKAGE, but have recognized limitations. Reactor coolant radioactivity levels will be low during initial reactor startup and for a few weeks thereafter, until activated corrosion products have been formed and fission products appear from fuel element cladding contamination or cladding defects. If there are few fuel element cladding defects and low levels of activation products, it may not be possible for the gaseous

or particulate containment atmosphere radioactivity monitors to detect a 1 gpm increase within four hours during normal operation. However, the gaseous or particulate containment atmosphere radioactivity monitor is OPERABLE when it is capable of detecting a 1 gpm increase in unidentified LEAKAGE within 1 hour given an RCS activity equivalent to that assumed in the design calculations for the monitors (Reference 3).

An increase in humidity of the containment atmosphere could indicate the release of water vapor to the containment. The condensate drain flow from the CFCUs is collected and the average flow rate is manually determined using the elapsed time to collect a constant volume of condensate. Elapsed times less than a predefined value indicate a 1 gpm increase in unidentified LEAKAGE. The time required to detect a 1 gpm or more increase above the normal value varies based on environmental and system conditions and may take longer than 1 hour and up to 4 hours. This sensitivity is acceptable for CFCU condensate collection monitor OPERABILITY.

Revised

OPERABILITY of the RCS leakage detection instrumentation includes the control room indication associated with the instrumentation and control room alarms for the gaseous and particulate containment atmosphere radioactivity monitors.

The LCO is satisfied when monitors of diverse measurement means are available. Thus, the containment sump monitor~~ing~~ systems, the particulate radioactivity monitor and either a CFCU condensate collection monitor or a gaseous radioactivity monitor provides an acceptable minimum.

APPLICABILITY

Because of elevated RCS temperature and pressure in MODES 1, 2, 3, and 4, RCS leakage detection instrumentation is required to be OPERABLE. In MODE 5 or 6, the temperature is to be ≤ 200°F and pressure is maintained low or at atmospheric pressure. Since the temperatures and pressures are far lower than those for MODES 1, 2, 3, and 4, the likelihood of leakage and crack propagation are much smaller. Therefore, the requirements of this LCO are not applicable in MODES 5 and 6.

ACTIONS

A.1 and A.2

With ~~the required~~ any containment sump monitor~~s~~ inoperable, RCS water inventory balance, the containment atmosphere particulate radioactivity monitor, and the CFCU condensate collection monitoring system will provide indications of changes in leakage. Together with the containment atmosphere radioactivity monitors, the periodic surveillance for RCS water inventory balance, SR 3.4.13.1, must be performed at an increased frequency of 24 hours to provide information that is adequate to detect leakage. A Note is added allowing that SR 3.4.13.1 is not required to be performed until 12 hours after establishing steady state operation as

(continued)

BASES

ACTIONS

A.1 and A.2 (continued)

defined in Bases of SR 3.4.13.1. The 12 hour allowance provides sufficient time to collect and process all necessary data after stable plant conditions are established.

Restoration of the ~~required~~ sump monitoring system to OPERABLE status within a Completion Time of 30 days is required to regain the function after the monitoring system failure. This time is acceptable considering the Frequency and adequacy of the RCS water inventory balance required by Required Action A.1.

B.1.1, B.1.2, and B.2

With the particulate containment atmosphere radioactivity monitor~~ing instrumentation channels~~ inoperable, alternative action is required. Either grab samples of the containment atmosphere must be taken and analyzed or water inventory balances, in accordance with SR 3.4.13.1, must be performed to provide alternate periodic information.

With a sample obtained and analyzed or water inventory balance performed every 24 hours, the reactor may be operated for up to 30 days to allow restoration of the ~~required~~ containment atmosphere particulate radioactivity monitor. ~~Alternatively, continued operation is allowed if the air cooling condensate flow rate monitoring system is OPERABLE, provided grab samples are taken or water inventory balances are performed every 24 hours.~~

The 24 hour interval provides periodic information that is adequate to detect leakage. A Note is added allowing that SR 3.4.13.1 is not required to be performed until 12 hours after establishing steady state operation defined in Bases of SR 3.4.13.1. The 12 hour allowance provides sufficient time to collect and process all necessary data after stable plant conditions are established. The 30 day Completion Time recognizes at least one other form of LEAKAGE detection is available.

C.1.1, C.1.2, C.2.1, and C.2.2

With the required containment atmosphere gaseous radioactivity monitor and the required CFCU condensate collection monitor inoperable, the means of detecting leakage are the containment sump monitoring system and the containment atmosphere particulate radioactivity monitor. This Condition does not provide all the required diverse means of leakage detection. With both gaseous containment atmosphere radioactivity monitoring and CFCU condensate monitoring instrumentation channels inoperable, alternate action is required. Either grab samples of the containment atmosphere must be taken and

(continued)

BASES

ACTIONS

C.1.1, C.1.2, C.2.1, and C.2.2 (continued)

analyzed or water inventory balances, in accordance with SR 3.4.13.1, must be performed to provide alternate periodic information.

The follow-up Required Action is to restore either of the inoperable required monitors to OPERABLE status within 30 days to regain the intended leakage detection diversity. The 30 day Completion Time ensures that the plant will not be operated in a reduced configuration for a lengthy time period.

D.1, D.2.1, D.2.2, and D.2.3

With any containment sump monitor, the containment atmosphere particulate radioactivity monitor, and the CFCU condensate collection monitor inoperable, the only means of detecting LEAKAGE is the containment gaseous radioactivity monitor. The containment atmosphere gaseous radioactivity monitor typically cannot detect a 1 gpm leak within four hours when RCS activity is low. In addition, this configuration does not provide the required diverse means of leakage detection. Indirect methods of monitoring RCS leakage must be implemented. Grab samples of the containment atmosphere must be taken and analyzed to provide alternate periodic information. The 12 hour interval is sufficient to detect increasing RCS leakage. The Required Action provides 7 days to restore another RCS leakage monitor to OPERABLE status to regain the intended leakage detection diversity. The 7 day Completion Time ensures that the plant will not be operated in a degraded configuration for a lengthy time period.

E.1, E.2, and E.3

With all required monitors inoperable, (LCO a, b, and c) no TS 3.4.15 required means of monitoring leakage are available. Frequent use of indirect methods of monitoring RCS leakage must be implemented. Grab samples of the containment atmosphere must be taken and analyzed and an RCS water inventory balance (SR 3.4.13.1) must be performed every 6 hours to provide alternate periodic information.

With a sample obtained and analyzed and a water inventory balance performed every 6 hours, 72 hours is provided to restore at least one RCS leakage monitor. The 72 hour Completion Time is reasonable, considering the low probability of a significant RCS leak occurring during this time and the avoidance of a plant shutdown in response to the loss of monitoring equipment, while providing a reasonable time to restore a monitor to OPERABLE status.~~, and immediate plant shutdown in accordance with LCO 3.0.3 is required.~~

F.1 and F.2

If a Required Action of Condition A, B, C, D, or E cannot be met, the plant must be brought to a MODE in which the requirement does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.4.15.1

SR 3.4.15.1 requires the performance of a CHANNEL CHECK of the required containment atmosphere radioactivity monitors. The check gives reasonable confidence that the channels are operating properly. The Frequency of 12 hours is based on instrument reliability and is reasonable for detecting off-normal conditions.

SR 3.4.15.2

SR 3.4.15.2 requires the performance of a CHANNEL FUNCTIONAL TEST (CFT) on the required containment atmosphere radioactivity monitors. The test ensures that the monitors can perform their function in the desired manner including alarm functions. The Frequency of 92 days considers instrument reliability, and operating experience has shown that it is proper for detecting degradation.

SR 3.4.15.3, SR 3.4.15.4, and SR 3.4.15.5

These SRs require the performance of a CHANNEL CALIBRATION for each of the RCS leakage detection instrumentation channels. The calibration verifies the accuracy of the instrument string, including the instruments located inside containment. The Frequency of 24 months

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.4.15.3, SR 3.4.15.4, and SR 3.4.15.5 (continued)

(except for the ~~required~~ containment atmosphere particulate and gaseous radioactivity monitors which have a frequency of 18 months) is consistent with refueling cycle and considers channel reliability. Again, operating experience has proven that this Frequency is acceptable.

REFERENCES

1. 10 CFR 50, Appendix A, Section IV, GDC 30.
2. Regulatory Guide 1.45, Revision 0, "Reactor Coolant Pressure Boundary Leakage Detection Systems," May 1973..
3. FSAR, Section 5.2.7.
4. NUREG-609, "Asymmetric Blowdown Loads on PWR Primary System," 1981.
5. Generic Letter 84-04, "Safety Evaluation of Westinghouse Topical Reports Dealing with Elimination of Postulated Breaks in PWR Primary Main Loops."
6. FSAR, Section 3.6B.
7. NUREG-1061, Volume 3, "Report of the U.S. Nuclear Regulatory Commission Piping Review Committee," 1984.

TS Bases Inserts

Insert 1

For this reason, in addition to meeting the OPERABILITY requirements, the gaseous and particulate containment atmosphere radioactivity monitor alarms are typically set to provide the most sensitive response without causing an excessive number of spurious alarms.

Insert 2

Some of these systems could serve as early alarm systems signaling the operators that closer examination of other detection systems is necessary to determine the extent of any corrective action that may be required.

Insert 3

alarm or an