UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

January 24, 2011

Mr. John T. Conway
Senior Vice President – Energy Supply
and Chief Nuclear Officer
Pacific Gas and Electric Company
Diablo Canyon Power Plant
77 Beale Street, Mail Code B32
San Francisco, CA 94105

SUBJECT: DIABLO CANYON POWER PLANT, UNIT NOS. 1 AND 2 - ISSUANCE OF AMENDMENTS RE: REVISION TO TECHNICAL SPECIFICATION 3.4.15, "RCS LEAKAGE DETECTION INSTRUMENTATION" (TAC No. ME1644 AND ME1645)

Dear Mr. Conway:

The U.S. Nuclear Regulatory Commission (NRC) has issued the enclosed Amendment No. 209 to Facility Operating License No. DPR-80 and Amendment No. 211 to Facility Operating License No. DPR-82 for the Diablo Canyon Power Plant, Unit Nos. 1 and 2, respectively. The amendments consist of changes to the Technical Specifications (TSs) in response to the Pacific Gas and Electric Company's (PG&E's, the licensee's) application dated July 3, 2009, as supplemented by letters dated April 9 and July 22, 2010.

The amendments revise TS 3.4.15, "RCS [Reactor Coolant System] Leakage Detection Instrumentation," to add a new Condition D for any inoperable containment sump monitor, containment atmosphere particulate radioactivity monitor, and containment fan cooler unit condensate collection monitor. Also, various changes have been made to TS 3.4.15 Condition A, Required Action A.2, Condition B, Required Action B.2, and the associated Bases. The NRC staff has denied the proposed change to TS 3.4.15 Condition E.

PG&E has stated that this amendment is based on the draft Technical Specification Task Force (TSTF) Change Traveler TSTF-513, "Revise PWR [Pressurized-Water Reactor] Operability Requirements and Actions for RCS Leakage Instrumentation." The licensee has made a regulatory commitment to review the final TSTF-513 and submit a license amendment request to implement the approved generic change within 6 months of approval of the TSTF Traveler, if the approved TSTF Traveler TSs is determined to be more restrictive than the proposed TSs in its letter dated July 3, 2009. This commitment was made before the TSTF-513 was approved. On January 3, 2011, the NRC announced in the *Federal Register* the availability of the model application and model safety evaluation for the plant-specific adoption of TSTF-513, Revision 3 (76 FR 189), as part of the consolidated line item improvement process (CLIIP). The NRC staff has compared the proposed amendment to TSTF-513 and concluded that the proposed amendment meets the intent of TSTF-513. Proposed changes to Condition E were denied as these changes were removed from the proposed changes in TSTF-513 during the TSTF approval process. The basis for its removal is discussed in TSTF-513. The licensee has stated that it will follow future industry guidance regarding the possible changes to Condition E.

The NRC staff has concluded that the amendment meets the intent of TSTF-513 except for proposed changes to Condition E, which is denied and, therefore, the regulatory commitment regarding TSTF-513 is not needed for approval of this amendment.

A copy of the related safety evaluation is enclosed. The Notice of Issuance will be included in the Commission's next regular biweekly *Federal Register* notice.

Sincerely,

Alan Wang

Alan Wang, Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-275 and 50-323

Enclosures:
1. Amendment No. 209 to DPR-80
2. Amendment No. 211 to DPR-82
3. Safety Evaluation

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

PACIFIC GAS AND ELECTRIC COMPANY

DOCKET NO. 50-275

DIABLO CANYON NUCLEAR POWER PLANT, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 209
License No. DPR-80

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Pacific Gas and Electric Company (the licensee), dated July 3, 2009, as supplemented on April 9 and July 22, 2010, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and Paragraph 2.C.(2) of Facility Operating License No. DPR-80 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 209, are hereby incorporated in the license. Pacific Gas & Electric Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan, except where otherwise stated in specific license conditions.

3. This license amendment is effective as of its date of issuance and shall be implemented within 180 days.

FOR THE NUCLEAR REGULATORY COMMISSION

Michael T. Markley, Chief
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Facility
Operating License No. DPR-80
and Technical Specifications

Date of Issuance: January 24, 2011

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

PACIFIC GAS AND ELECTRIC COMPANY

DOCKET NO. 50-323

DIABLO CANYON NUCLEAR POWER PLANT, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 211
License No. DPR-82

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Pacific Gas and Electric Company (the licensee), dated July 3, 2009, as supplemented on April 9 and July 22, 2010, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and Paragraph 2.C.(2) of Facility Operating License No. DPR-82 is hereby amended to read as follows:

(2) Technical Specifications (SSER 32, Section 8)* and Environmental Protection Plan

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 211, are hereby incorporated in the license. Pacific Gas & Electric Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan, except where otherwise stated in specific license conditions.

3. This license amendment is effective as of its date of issuance and shall be implemented within 180 days.

FOR THE NUCLEAR REGULATORY COMMISSION

Michael T. Markley, Chief
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Facility
Operating License No. DPR-82
and Technical Specifications

Date of Issuance: January 24, 2011

ATTACHMENT TO LICENSE AMENDMENT NO. 209

TO FACILITY OPERATING LICENSE NO. DPR-80

AND AMENDMENT NO. 211 TO FACILITY OPERATING LICENSE NO. DPR-82

DOCKET NOS. 50-275 AND 50-323

Replace the following pages of the Facility Operating License Nos. DPR-80 and DPR-82, and Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Facility Operating License No. DPR-80

REMOVE	INSERT
-3-	-3-

Facility Operating License No. DPR-82

REMOVE	INSERT
-3-	-3-

Technical Specifications

REMOVE	INSERT
3.4-32	3.4-32
3.4-33	3.4-33
3.4-34	3.4-34
3.4-34a	3.4-34a

(4) Pursuant to the Act and 10 CFR Parts 30, 40, and 70, to receive, possess, and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; and

(5) Pursuant to the Act and 10 CFR Parts 30, 40, and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.

C. This License shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

The Pacific Gas and Electric Company is authorized to operate the facility at reactor core power levels not in excess of 3411 megawatts thermal (100% rated power) in accordance with the conditions specified herein.

(2) Technical Specifications

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 209, are hereby incorporated in the license. Pacific Gas & Electric Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan, except where otherwise stated in specific license conditions.

(3) Initial Test Program

The Pacific Gas and Electric Company shall conduct the post-fuel-loading initial test program (set forth in Section 14 of Pacific Gas and Electric Company's Final Safety Analysis Report, as amended), without making any major modifications of this program unless modifications have been identified and have received prior NRC approval. Major modifications are defined as:

a. Elimination of any test identified in Section 14 of PG&E's Final Safety Analysis Report as amended as being essential;

(4) Pursuant to the Act and 10 CFR Parts 30, 40, and 70, to receive, possess, and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; and

(5) Pursuant to the Act and 10 CFR Parts 30, 40, and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.

C. This License shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

The Pacific Gas and Electric Company is authorized to operate the facility at reactor core power levels not in excess of 3411 megawatts thermal (100% rated power) in accordance with the conditions specified herein.

(2) Technical Specifications (SSER 32, Section 8)* and Environmental Protection Plan

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 211, are hereby incorporated in the license. Pacific Gas & Electric Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan, except where otherwise stated in specific license conditions.

(3) Initial Test Program (SSER 31, Section 4.4.1)

Any changes to the Initial Test Program described in Section 14 of the FSAR made in accordance with the provisions of 10 CFR 50.59 shall be reported in accordance with 50.59(b) within one month of such change.

*The parenthetical notation following the title of many license conditions denotes the section of the Safety Evaluation Report and/or its supplements wherein the license condition is discussed.

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.15 RCS Leakage Detection Instrumentation

LCO 3.4.15 The following RCS leakage detection instrumentation shall be OPERABLE:

a. Both containment structure sumps and the reactor cavity sump level and flow monitor system,

b. One containment atmosphere particulate radioactivity monitor and,

c. Either a containment fan cooler unit (CFCU) condensate collection monitor or the containment atmosphere gaseous radioactivity monitor.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Any containment sump monitor inoperable.	----------NOTE---------- Not required until 12 hours after establishment of steady state operation. ----------	
	A.1 Perform SR 3.4.13.1.	Once per 24 hours
	AND	
	A.2 Restore containment sump monitor to OPERABLE status.	30 days
B. Containment atmosphere particulate radioactivity monitor inoperable.	B.1.1 Analyze grab samples of the containment atmosphere. OR	Once per 24 hours (continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. (continued)	B.1.2	----------NOTE---------- Not required until 12 hours after establishment of steady state operation. ---------- Perform SR 3.4.13.1.	Once per 24 hours
	AND		
	B.2	Restore containment atmosphere particulate radioactivity monitor to OPERABLE status.	30 days
C. Required containment atmosphere gaseous radioactivity monitor inoperable. AND Required CFCU condensate collection monitor inoperable.	C.1.1	Analyze grab samples of the containment atmosphere	Once per 24 hours
		OR	
	C.1.2	---------NOTE---------- Not required until 12 hours after establishment of steady state operation. ---------- Perform SR 3.4.13.1	Once per 24 hours
	AND		
	C.2.1	Restore required containment atmosphere gaseous radioactivity monitor to OPERABLE status.	30 days
		OR	
	C.2.2	Restore required CFCU condensate collection monitor to OPERABLE status.	30 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
D. Any containment sump monitor inoperable. AND Containment atmosphere particulate radioactivity monitor inoperable. AND Required CFCU condensate collection monitor inoperable.	D.1	Analyze grab samples of the containment atmosphere. AND	Once per 12 hours
	D.2.1	Restore containment sump monitor to OPERABLE status. OR	7 days
	D.2.2	Restore containment atmosphere particulate radioactivity monitor to OPERABLE status. OR	7 days
	D.2.3	Restore required CFCU condensate collection monitor to OPERABLE status.	7 days
E. All required monitors inoperable.	E.1	Enter LCO 3.0.3.	Immediately
F. Required Action and associated Completion Time not met.	F.1 AND	Be in MODE 3.	6 hours
	F.2	Be in MODE 5.	36 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.4.15.1	Perform CHANNEL CHECK of the required containment atmosphere particulate and gaseous radioactivity monitors.	In accordance with the Surveillance Frequency Control Program
SR 3.4.15.2	Perform CHANNEL FUNCTIONAL TEST of the required containment atmosphere particulate and gaseous radioactivity monitors.	In accordance with the Surveillance Frequency Control Program
SR 3.4.15.3	Perform CHANNEL CALIBRATION of the required containment sump monitors.	In accordance with the Surveillance Frequency Control Program
SR 3.4.15.4	Perform CHANNEL CALIBRATION of the required containment atmosphere particulate and gaseous radioactivity monitors.	In accordance with the Surveillance Frequency Control Program
SR 3.4.15.5	Perform CHANNEL CALIBRATION of the required CFCU condensate collection monitors.	In accordance with the Surveillance Frequency Control Program

UNITED STATES
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 209 TO FACILITY OPERATING LICENSE NO. DPR-80

AND AMENDMENT NO. 211 TO FACILITY OPERATING LICENSE NO. DPR-82

PACIFIC GAS AND ELECTRIC COMPANY

DIABLO CANYON POWER PLANT, UNIT NOS. 1 AND 2

DOCKET NOS. 50-275 AND 50-323

1.0 INTRODUCTION

By application dated July 3, 2009, as supplemented by letters dated April 9 and July 22, 2010 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML0919601770, ML101100470, and ML102030499, respectively), Pacific Gas and Electric Company (PG&E or the licensee) requested changes to the Technical Specifications (TSs) for the Diablo Canyon Power Plant, Unit Nos. 1 and 2 (DCPP).

The proposed amendments would revise TS 3.4.15, "RCS [Reactor Coolant System] Leakage Detection Instrumentation." Specifically, the proposed changes would add a new Condition D for any inoperable containment sump monitor, containment atmosphere particulate radioactivity monitor, and containment fan cooler unit (CFCU) condensate collection monitor. Also, the licensee proposed various changes to TS 3.4.15 Condition A, Required Action A.2, Condition B, Required Action B.2, Condition E, and the associated Bases. PG&E stated that this proposed amendment was based on the draft Technical Specification Task Force (TSTF) Change Traveler TSTF-513, "Revise PWR [Pressurized-Water Reactor] Operability Requirements and Actions for RCS Leakage Instrumentation." PG&E proposed this amendment prior to the TSTF-513 being issued, because when the containment atmosphere gaseous radioactivity monitor is inoperable, the plant operators must use the CFCU condensate collection system to meet TS 3.4.15.c, which is a more burdensome surveillance.

The supplemental letters dated April 9 and July 22, 2010, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the U.S. Nuclear Regulatory Commission (NRC) staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on August 25, 2009 (74 FR 42928).

2.0 REGULATORY EVALUATION

In Section 50.36, "Technical specifications," of Title 10 of the *Code of Federal Regulations* (10 CFR), the Commission established its regulatory requirements related to the content of TSs. Pursuant to 10 CFR 50.36, TSs are required to include items in the following five specific categories related to station operation: (1) safety limits, limiting safety system settings, and limiting control settings; (2) limiting conditions for operation (LCOs); (3) surveillance requirements; (4) design features; and (5) administrative controls. The rule does not specify the particular requirements to be included in a plant's TSs.

The regulations in 10 CFR Part 50, Appendix A, General Design Criterion (GDC) 4, "Environmental and dynamic effects design bases," state, in part, that

> ...dynamic effects associated with postulated pipe ruptures in nuclear power units may be excluded from the design basis when analyses reviewed and approved by the Commission demonstrate that the probability of fluid system piping rupture is extremely low under conditions consistent with the design basis for the piping.

The NRC allows the application of leak-before-break (LBB) technology on the primary piping systems under the broad-scope revision to 10 CFR Part 50, Appendix A, GDC 4 (52 FR 41288-41295; October 27, 1987). Specific guidance on LBB evaluations is discussed in NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR [Light-Water Reactor] Edition" (SRP), Section 3.6.3, "Leak-Before-Break Evaluation Procedures." Section 3.6.3 of the SRP specifies that leak detection systems be reliable, redundant, diverse and sensitive, and that substantial margin exists to detect the leakage from the through-wall flaw used in the deterministic fracture mechanics evaluation.

Use of LBB at DCPP has been approved by the NRC in a safety evaluation dated March 2, 1993 (ADAMS Legacy Library Accession Nos. 9303050141, 9303050142). The ability to detect a 1 gallon per minute (gpm) leak in 4 hours was a criterion for acceptance of LBB at DCPP. Approval of the DCPP LBB analysis allowed the use of advanced fracture mechanics to demonstrate that flaws in specific piping types will develop slowly and be detected before they result in large breaks. The guidance for acceptance of LBB amendments was outlined in NUREG-1061, Volume 3, "Report of the U.S. Nuclear Regulatory Commission Piping Review Committee," November 1984 (ADAMS Accession No. ML093170485).

The regulations in 10 CFR 50, Appendix A, GDC 30, "Quality of reactor coolant pressure boundary," require, in part, that

> Means shall be provided for detecting and, to the extent practical, identifying the location of the source of reactor coolant leakage.

NRC Regulatory Guide (RG) 1.45, Revision 0, "Reactor Coolant Pressure Boundary Leakage Detection Systems," May 1973 (ADAMS Accession No. ML003740113), described acceptable methods of implementing the requirement of GDC 30. The construction permits for DCPP, Units 1 and 2 were issued prior to the guidance of RG 1.45 and the requirement of GDC 30. However, DCPP meets the intent of the GDCs and the NRC has reviewed this amendment against RG 1.45.

3.0 TECHNICAL EVALUATION

3.1 Background

On August 13, 2008, the NRC resident inspectors at the DCPP identified that the Unit 1 containment atmosphere gaseous radioactivity reactor coolant leak detection system capability was limited to detecting a 13-gpm leak within 1 hour instead of a 1 gpm leak within 1 hour as specified in RG 1.45. This is discussed on page 13 of the NRC Integrated Inspection Report 05000275/2008004 and 05000323/2008004 (ADAMS Accession No. ML083080113). The inspectors also raised a concern that the design assumption of failed reactor fuel was not present in Unit 1.

TS 3.4.15.c requires either a CFCU condensate collection monitor or the containment atmosphere gaseous radioactivity monitor to be operable. If this requirement is not met, TS 3.4.15 requires either monitor to be restored to operable status within 30 days or to place the unit in Mode 3 within the next 6 hours. The NRC resident inspectors found both monitors inoperable for more than 30 days.

The licensee entered the concern in its corrective action program via Action Request (AR) A0737958 on August 14, 2008, and documented in the AR that the containment atmosphere gaseous radioactivity monitor of the reactor coolant system (RCS) leak detection system was operable, in part, based on its ability to perform the design function as described in the DCPP Final Safety Analysis Report (FSAR). After review of AR A0737958, the NRC resident inspectors concluded that the gaseous radioactivity monitor was not operable because the conditions assumed for functionality, including a specified RCS source term, were not met. Subsequently, the licensee declared the gaseous radioactivity monitor inoperable on each unit on September 23, 2008, and placed the CFCU condensate collection monitor in TS 3.4.15.c in service.

On November 3, 2008, the NRC issued non-cited violation 05000275/2008004-03, documented in NRC Integrated Inspection Report 05000275/2008004 and 05000323/2008004 (ADAMS Accession No. ML083080113), for performing an inadequate operability evaluation of the Unit 1 containment atmosphere gaseous radioactivity monitor of the reactor coolant leak detection system.

The licensee has stated that the RCS leakage detection system did not meet all aspects of RG 1.45, Revision 0, at the time of construction but instead met the intent of the guidance and satisfies GDC 30. In particular, the containment atmosphere gaseous radioactivity monitor described in the DCPP application for the operating license did not have sufficient sensitivity to satisfy Regulatory Position C.5 of RG 1.45. Position C.5 recommends that airborne particulate or gaseous radioactivity monitors should be able to detect a 1-gpm leak in less than 1 hour. The RG 1.45 discussion on detector response time indicates that realistic RCS radioactivity concentrations should be used and the values used in the plant environmental report would be acceptable.

As noted in the amendment request, the DCPP RCS leakage detection systems described in the DCPP FSAR were approved by the Atomic Energy Commission (AEC) in the facility's Safety Evaluation Report (SER) issued in 1974. The SER states, in part, that,

> The leakage detection systems have detection capabilities which conform with those recommended in RG 1.45, and provide reasonable assurance that any structural degradation resulting in leakage during service will be detected in time to permit corrective actions. This constitutes an acceptable basis for satisfying the requirements of AEC GDC 30.

DCPP uses a variety of methods to monitor RCS leakage. The primary indications of leakage detection are changes in containment particulate and gaseous radioactivity, containment sump level, and containment condensation as described in DCPP's Updated Final Safety Analysis Report (UFSAR) Section 5.2.7.1. Containment radioactivity monitors take continuous air samples from the containment atmosphere and measure beta and/or gamma activity. The containment sumps collect RCS leakage that remains in the liquid state, and sump level and sump pump integrated flow are monitored. Containment condensation measurements monitor the volume of RCS leakage that vaporizes and is condensed on the cooling coils of the containment fan cooler. Additional indications of RCS leakage are available, including charging pump operation, RCS coolant inventory calculations, and containment atmosphere temperature and pressure measurements.

The response time for the containment atmosphere particulate and gaseous radioactivity monitors to detect leakage is dependent on the radioactivity concentration in the RCS. Since operation began, fuel integrity has improved, which has reduced the RCS radioactivity concentration and resulted in longer response times for the containment atmosphere gaseous and particulate radioactivity monitors. As a result, greater RCS leakage must occur for the containment radiation levels to reach the levels at which these monitors were designed to respond. The licensee stated in its license amendment request (LAR) that the containment atmosphere gaseous radioactivity monitor cannot be assured to detect a 1-gpm leak within 4 hours with normal RCS activity levels. In addition, although current RCS activity levels are low, it is expected that the RCS activity level will continue to decrease as industry initiatives for improved fuel performance are implemented and predicting future changing conditions in RCS activity and the impact on the response time of the containment atmosphere gaseous radioactivity monitor is not possible. However, the containment atmosphere gaseous radioactivity monitor continues to be important because experience has shown that it can respond even when low RCS activity is present, and it is useful to operators to identify RCS leakage, and to discriminate RCS leakage from other sources of leakage into containment. Therefore, the licensee proposes to revise the TS 3.4.15 Bases such that operability of the containment atmosphere gaseous radioactivity monitor is based on the design capabilities of the monitor described in the FSAR. The monitor response described in the FSAR is based on the original design calculations for the atmosphere gaseous radioactivity monitor that assumed an RCS activity associated with a minimum of 0.1 percent fuel defects. This change will allow TS 3.4.15.c to be normally met using the containment atmosphere gaseous radioactivity monitor and will remove the current burden on plant operators to use the CFCU condensate collection system to meet TS 3.4.15.c.

The proposed amendment would revise the conditions, required actions, and completion times of DCPP TS 3.4.15, "RCS Leakage Detection Instrumentation." TS 3.4.15 addresses the availability of leakage detection instruments and ensures adequate detection capability at all times, in compliance with GDC 30 of Appendix A to 10 CFR Part 50. This amendment also revises the discussion of operability and TS Bases for RCS leakage detection instrumentation.

The current LCO of TS 3.4.15 requires the following RCS leakage detection instrumentation be operable: (a) both containment structure sumps and the reactor cavity sump level and flow monitor system, (b) one containment atmosphere particulate radioactivity monitor and, (c) either a CFCU condensate collection monitor or the containment atmosphere gaseous radioactivity monitor.

3.2 LBB Analysis

The LBB methodology is based on sufficient fracture toughness (i.e., ductility) of certain piping materials to resist rapid flaw propagation. A postulated flaw in such piping should not lead to pipe rupture and potential damage to adjacent safety-related systems, structures, and components before the plant could be placed in a safe, shutdown condition. Before pipe rupture, the postulated flaw should lead to limited but detectable leakage which would be identified by the leak detection systems of the RCS in time for the operator to take action.

The NRC staff reviews the application of the LBB methodology to primary system piping to ensure that certain safety margins are satisfied to assure the structural integrity of the pipe. SRP Section 3.6.3 specifies a margin of the square-root of 2 be applied to the loads to assure that leakage-size flaws are stable at the normal load plus safe-shutdown earthquake load. A margin of 10 is to be applied to leakage so that detection of leakage from the postulated flaw size is ensured when the pipe is subjected to normal operational loads. In addition, the critical flaw size should be twice as large as the leakage flaw size (i.e., a margin of 2 on leakage flaw size). SRP Section 3.6.3 also specifies that leakage detection systems for LBB applications be sufficiently redundant, diverse, and sensitive. It further specifies that leak detection systems for LBB applications be equivalent to RG 1.45 for piping inside the containment. RG 1.45 specifies a time frame of 1 hour or less to detect a 1-gpm leak. This time frame ensures that plant operators have timely information about unidentified leakage.

NRC Generic Letter (GL) 84-04, "Safety Evaluation of Westinghouse Topical Reports Dealing with Elimination of Postulated Pipe Breaks in PWR [Pressurized-Water Reactor] Primary Main Loops (Generic Letter 84-04)," dated February 1, 1984 (ADAMS Accession No. ML031150562), addresses the asymmetric blowdown loads on the PWR primary systems that result from a limited number of discrete pipe-break locations. GL 84-04 stated that the asymmetric blowdown loads resulting from double-ended pipe breaks in main coolant loop piping need not be considered as a design basis for the Westinghouse Owners Group plants, provided two conditions were met. The GL 84-04 Condition 1 only applied to Haddam Neck Plant and Yankee Rowe Nuclear Station. The GL 84-04 Condition 2 relates to the design and operation of RCS leakage detection systems, and states that:

> Leakage detection systems at the facility should be sufficient to provide adequate margin to detect the leakage from the postulated circumferential throughwall flaw utilizing the guidance of Regulatory Guide 1.45, "Reactor Coolant Pressure

> Boundary Leakage Detection Systems," with the exception that the seismic qualification of the airborne particulate radiation monitor is not necessary. At least one leakage detection system with a sensitivity capable of detecting 1 gpm in 4 hours must be operable.

In addition, Section 5.7 of NUREG-1061, Volume 3, "Report of the U.S. Nuclear Regulatory Commission Piping Review Committee," discussed the leakage detection system requirements for LBB applications, specifically the time and capability to detect the presence of a leak for fluid systems inside containment and stated, in part, that,

> ...the Task Group recommends that the specified margin can be achieved as follows:
>
> (a) For PWRs, either operating or under construction, that meet all of the provisions of Regulatory Guide 1.45, each leakage detection system should be adequate to detect the rate of unidentified leakage, or its equivalent, of 1 gpm in less than one hour.
>
> (b) For operating PWRs that do not meet all of the provisions of Regulatory Guide 1.45, at least one leakage detection system with a sensitivity capable of detecting an unidentified leakage rate of one gpm in four hours should be operable.

By letter dated March 16, 1992 (ADAMS Legacy Library Accession No. 9203230334), the licensee requested approval of a plant-specific LBB analysis for the RCS primary loop piping at DCPP. By letter dated March 2, 1993, the NRC approved LBB for the RCS primary loop piping in a safety evaluation. The NRC concluded that the leakage detection system for the reactor coolant pressure boundary meets the intent of RG 1.45, which recommends that a leakage of 1 gpm in 1 hour be detected. In addition, the NRC staff concluded that DCPP's plant-specific LBB analysis met all of the SRP 3.6.3 criteria except for the elbow weld connecting the crossover leg and reactor coolant pump where the margin between the leakage-size flaw and the critical-size flaw was 1.95. This exception was found to be acceptable in the NRC safety evaluation which stated,

> Considering the overall crack size calculation, the staff believes that the margin of 1.95 is within the uncertainty bounds of 2.0 and is acceptable. The structural integrity of the pipe during a leak-before-break event will not be compromised.

By letter dated June 2, 1997 (ADAMS Legacy Library Accession Nos. 9706230042 and 97606230049), the licensee converted TS 3.4.15 to the Westinghouse Standard Technical Specifications in LAR 97-09. By letter dated May 28, 1999 (ADAMS Accession No. ML022390370), the NRC approved the LAR 97-09 in Amendment No. 135. After the conversion, the TS 3.4.15 Bases Applicable Safety Analysis Section was updated to state:

> The resolution of [unresolved safety issue] USI-2 for Westinghouse PWRs was the use of fracture mechanics technology for RCS piping > 10 inches diameter. 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 NRC staff has approved a leak detection system capability of detecting a 1-gpm leak within 4 hours in the current TS 3.4.15.

3.3 Proposed Changes

In its submittal, the licensee proposed to make the following changes to TS 3.4.15, "RCS Leakage Detection Instrumentation":

- Remove the word "required" from Condition A, Required Action A.2, Condition B, and Required Action B.2;
- Revise Condition A to apply to any inoperable containment sump monitor;
- Revise the name of the containment fan cooler unit (CFCU) condensate collection monitor in Condition C and Required Action C.2.2;
- Add a new Condition D for only the containment atmosphere gaseous radioactivity monitor operable;
- Revise Condition E for all required monitors inoperable; and
- Revise the basis for operability of the required monitors in the TS Bases.

3.3.1 Removal of the Word "Required" from Condition A, Required Action A.2, Condition B, and Required Action B.2

This change corrects the usage of the word "required" in TS 3.4.15. In its letter dated July 3, 2009, the licensee stated, "The term 'required' is reserved for situations in which there are multiple ways to meet the LCO," and in those cases where the term is to be removed, there are not multiple ways to meet the LCO. Removal of the word "required" in these cases does not change the set of RCS leakage detection instruments that must be operable to meet the LCO. After reviewing the proposed change and the current licensing basis, the NRC staff determined that this change is editorial in nature and does not alter the requirements or implementation of TS 3.4.15. Based on the above, the staff concludes the proposed change is acceptable.

3.3.2 Revision of Condition A to Apply to Any Inoperable Containment Sump Monitor

In the proposed amendment, the wording of Condition A is changed from "Required containment sump monitors inoperable" to "Any containment sump monitor inoperable." As described in the LAR, this change is made to prevent misinterpretation that Condition A applies only when more than one containment sump monitor is inoperable. The NRC staff has determined that this change is editorial in nature and does not alter the requirements or implementation of TS 3.4.15. Based on the above, the staff concludes the proposed change is acceptable.

3.3.3 Revision of the Name of the CFCU Condensate Collection Monitor in Condition C and Required Action C.2.2

This change corrects the term "containment air cooler condensate flow rate monitor" to "CFCU condensate collection monitor" in Condition C and Required Action C.2.2. "Containment air cooler condensate flow rate monitor" is the term used in the Westinghouse Standard Technical Specifications (NUREG-1431) and the proposed change corrects the term to agree with PG&E terminology. The NRC staff has determined that this change is editorial in nature and does not alter the requirements or implementation of TS 3.4.15. Based on the above, the staff concludes the proposed change is acceptable.

3.3.4 Addition of New Condition D

New TS 3.4.15 Condition D is proposed for the case where the containment atmosphere gaseous radioactivity monitor is the only operable monitor. The new condition requires the licensee to analyze grab samples of the containment atmosphere every 12 hours and restore another required leakage detection instrument to operable status within 7 days. Current TS 3.4.15 allows 30 days to restore another required instrument if the containment atmosphere gaseous radioactivity monitor is the inoperable instrument. The NRC staff determined that this proposed addition is more restrictive than the current TS and, therefore, is acceptable.

The required action to collect grab samples provides another method for detecting RCS leakage and has sensitivity comparable to the containment atmosphere particulate radioactivity monitor. Analyzing grab samples of the containment atmosphere on a 12-hour interval provides an alternate method of detecting increasing leakage. The required actions and completion times provide adequate assurance that any RCS leakage resulting from structural degradation will be detected in time to permit corrective actions. Additional confirmation of RCS leakage measurements is provided by the RCS water inventory balance required by Surveillance Requirement (SR) 3.4.13 every 72 hours.

Use of a plant-specific LBB analysis for DCPP has been previously approved by the NRC staff. This analysis is the basis for the licensee's determination that a postulated flaw in RCS piping would not lead to pipe rupture before leakage was detected and the plant could be placed in a safe shutdown condition. Continuous leakage detection capable of alerting operators to the presence of RCS leakage of at least 1 gpm in 4 hours constitutes an important part of the licensing basis for LBB at DCPP, in order to provide additional safety margin. The containment atmosphere gaseous radioactivity monitor is less sensitive than the other monitors required in TS 3.4.15 and, as stated by the licensee, may not be capable of detecting leakage of 1 gpm within 4 hours at very low concentrations of RCS radioactivity. Should the plant enter current Condition D, leakage detection with the necessary sensitivity would not be available.

The NRC staff reviewed the guidance for LBB applications, the plant licensing basis, and information provided in the LAR to determine the acceptability of the addition of new Condition D to TS 3.4.15. During plant operation under new Condition D, the containment atmosphere gaseous radioactivity monitor would provide continuous leakage detection capability, and the containment atmosphere grab samples would provide periodic monitoring of leakage detection with sensitivity comparable to the containment atmosphere particulate

radioactivity monitor. It is noted by the NRC staff that the containment atmosphere gaseous radioactivity monitor still provides useful information to plant operators, provided the alarm setpoints are chosen conservatively. The combined use of the containment gaseous radioactivity monitor and containment atmosphere grab samples partially mitigates the unavailability of more sensitive, continuous leakage detection monitors. Also, a variety of non-TS indications of RCS leakage are available to operators in the control room.

Crack growth rates determined using the LBB methodology are slow, such that a flaw in the RCS piping would result in leakage detectable by the available methods under new Condition D. Multiple conservative assumptions are built into the LBB analysis, in addition to the sensitivity of leakage detection monitors, and there is still margin in the analysis while operating with a reduced leakage detection capability. The 7-day completion time to return either the containment sump monitor, containment atmosphere particulate radioactivity monitor, or the CFCU condensate collection monitor to operable status ensures that the plant will not operate in this degraded condition for an extended period of time.

3.3.5 Revision to Current Condition E

The proposed change to Condition E (all required monitors inoperable) would add actions for periodic water inventory balance calculations and containment atmosphere grab samples, and would establish a 72-hour completion time to restore at least one required monitor to operable status. During the review of this proposed change for TSTF-513, the NRC requested that this change be removed from final version of TSTF-513. The basis for this removal is discussed in the TSTF-513, Revision 3 (ADAMS Accession No. ML102360355). As such, to be consistent with TSTF-513, the NRC staff has denied this change. The licensee has stated it will follow future industry guidance regarding the possible changes to Condition E.

3.3.6 Changes to TS Bases Document

Several changes were proposed to the TS Bases redefining the operability requirements for the RCS leakage detection monitors identified in TS 3.4.15. The NRC staff reviewed these changes in comparison with the current licensing basis and UFSAR.

The first major change to the operability requirements indicates that a 4-hour response time under realistic operating conditions is the basis for operability of the containment sump monitors, the particulate radioactivity monitors, the gaseous radioactivity monitors, and the CFCU condensate collection monitor. The licensee stated that TS 3.4.15 leakage detection instruments are designed to be capable of a 1-hour response time such that they can detect a 1-gpm leak rate within 1 hour at the design conditions and assumptions. However, a 4-hour response time may be needed during certain realistic operating conditions when design conditions and assumptions do not exist due to a specific leak location, RCS temperature, RCS activity, and containment humidity. For example, the CFCU condensate collection monitor may not be capable of detecting a 1-gpm leak rate within 1 hour during operation in Mode 4 when the RCS temperature is below 212 degrees Fahrenheit. The licensee derived a 4-hour response time from LBB guidance provided in GL 84-04 and Section 5.7 of NUREG-1061, Volume 3. This guidance stated that availability of at least one leakage detection instrument with a 4-hour response time was sufficient to approve usage of the LBB methodology in those plants that did not meet the guidance of RG 1.45, Revision 0. Each of the leakage detection systems at DCPP

was designed with the capability to detect a 1-gpm leak in 1 hour, given the assumptions and conditions of the design calculations (UFSAR Section 5.2.7.4). However, the licensee stated that realistic variances from the design assumptions may result in increased response times. The 4-hour response time described in the TS Bases change would still meet the LBB guidance and the intent of RG 1.45, Revision 0, to provide prompt indication of leakage to control room operators. The licensee previously added a reference to this LBB methodology criterion to the TS 3.4.15 Applicable Safety Analysis Section through LAR 97-09. The NRC staff concludes that the licensee has provided sufficient technical basis to support a leakage detection capability of 1 gpm within 4 hours. This capability is consistent with the staff's LBB methodology criterion approved through LAR 97-09.

Second, the licensee proposed TS Bases changes for the containment gaseous and particulate radioactivity monitors. These changes state that the monitor response time for operability is based on the RCS activity level assumed in the design calculations. The response time of the radioactivity monitors is dependent on the activity level of the RCS and the associated percentage of fuel defects to produce that activity level. The original design calculations determined that the containment gaseous and particulate radioactivity monitors were capable of detecting a 1-gpm leak in less than 1 hour, assuming 0.1 percent fuel defects, as described in DCPP UFSAR Section 5.2.7. The NRC staff has concluded that using the designed monitor response time assumption for percentage of fuel defects, that both monitors would meet the revised operability requirement of detecting a 1-gpm leak in less than 4 hours.

RG 1.45, Revision 0, states, "In analyzing the sensitivity of leak detection systems using airborne particulate or gaseous radioactivity, a realistic primary coolant radioactivity concentration assumption should be used." The licensee stated that the actual percentage of fuel defects at DCPP, and therefore RCS activity concentration, has been consistently lower than the design assumption. As a result, the radioactivity monitors may not able to detect a 1-gpm leak within 4 hours under realistic operating conditions.

However, RG 1.45, Revision 0, goes on to state, "The expected values [for primary coolant radioactivity concentration] used in the plant environmental report would be acceptable." The assumption of 0.1 percent fuel defects used in the design calculations of the containment atmosphere radioactivity monitors is less than the percentage of failed fuel assumed in the environmental report. The NRC staff has concluded that defining the operability of the containment radioactivity monitors using the design assumptions follows the guidance of RG 1.45, Revision 0.

The intent of RG 1.45, Revision 0, is to detect and monitor RCS leakage such that operators have sufficient time to take corrective actions. While the response time of the containment atmosphere particulate and gaseous radioactivity monitors vary with the RCS activity concentration and leak rate, these monitors still provide useful indication of RCS leakage. Together with the available indications of RCS leakage identified in UFSAR Section 5.2.7, RCS leakage can be detected with sufficient time to implement corrective actions. The NRC staff believes that this change to the definition of operability for the containment atmosphere radioactivity monitors will not result in insufficient time to take corrective actions in response to leakage. Therefore, the RCS leakage detection systems continue to meet the intent of RG 1.45, Revision 0.

The usefulness of the containment atmosphere particulate and gaseous radioactivity monitors can be improved by choosing the alarm setpoints conservatively. In a request for additional information (RAI) dated March 3, 2010 (ADAMS Accession No. ML100630301), the NRC staff asked the licensee to describe how the setpoints for the containment gaseous radioactivity monitors would be determined during normal operating conditions. In its letter dated April 9, 2010, the licensee stated that alarms are "administratively set to provide a sensitive response at a low count rate above background such that spurious alarms are not excessive." Using alarm setpoints that are as low as possible without causing spurious alarms maximizes the capability of the radioactivity monitors under the normal conditions where RCS activity is lower than their design assumptions.

The last major change proposed by the licensee is to remove all alarms from the operability requirements of all RCS leakage detection monitors. The license stated in the LAR that "the DCPP RCS leakage detection system design [is] based on visual monitoring of control room indication and not alarms as initially described in [UFSAR] Section 5.2.4." Monitor readings for the containment atmosphere gaseous and particulate radioactivity monitors are compared as part of normal shift checks, and the containment sumps and CFCU condensate collection systems do not have alarms based on leak rate. For this reason, the licensee proposed to remove alarms from the operability discussions.

The NRC staff reviewed the current licensing basis as documented in the UFSAR and TS to evaluate the licensee's proposal to remove alarms from the operability discussion of TS 3.4.15. Alarms were addressed in the original DCPP Units 1 and 2 SER, Section 5.4.7, which stated that the RCS leakage detection system would "include suitable control alarms and read-outs, and conforms with the functional requirements recommended in RG 1.45." Additionally, RG 1.45, Revision 0, states that, "indicators and alarms for each leakage detection system should be provided in the main control room." Alarms are continuously available to alert operators to abrupt changes in RCS leakage that otherwise may not be recognized until the next performance of shift checks. This function is an important role of the RCS leakage detection system, even though the alarms do not correspond to a quantified leakage rate.

In the RAI dated March 3, 2010, the NRC staff requested that either the alarms remain in the TS Bases discussion or the licensee provide further justification for their removal. In the licensee's response dated April 9, 2010, it was agreed to that the licensee would retain the discussion of alarms in the TS Bases for SR 3.4.15.2.

After reviewing the proposed revision and RAI responses, the NRC staff has determined that the changes to the TS Bases are acceptable. The revisions to the discussion of operability for each leakage detection monitor realistically describe the capabilities necessary to achieve the system's intended function. Retention of alarms in the discussion provides an additional assurance that leakage can be detected as soon as possible.

The NRC staff has reviewed the proposed amendment to the operating licenses of DCPP in accordance with the applicable regulations and guidance and the NRC staff concludes that the amendment request is acceptable except for the proposed Condition E. Proposed Condition E is denied as it was removed from TSTF-513 during the TSTF review. On January 3, 2011, the NRC announced in the *Federal Register* the availability of the model application and model safety evaluation for the plant-specific adoption of TSTF-513, Revision 3 (76 FR 189), as part of

the consolidated line item improvement process (CLIIP). The NRC staff reviewed the amendment against the CLIIP for TSTF-513 and has concluded with the denial of Condition E, it is consistent with and meets the intent of the CLIIP but reflects the DCPP plant-specific licensing bases design.

4.0 REGULATORY COMMITMENT

In support of the proposed LAR, the licensee provided the following regulatory commitment in its supplemental letter dated July 22, 2010:

> When TSTF-513 is approved by the staff, it may contain TS requirements that significantly deviate from those proposed by PG&E in Reference 1 [to the licensee's letter dated July 22, 2010]. PG&E will follow the efforts of the Technical Specification Task Force (TSTF) and NRC to finalize the details and scope of the changes needed to resolve the TSTF-513 RCS leakage detection issue. If the approved TSTF Traveler TS is more restrictive than the proposed TS in Reference 1 [to the licensee's letter dated July 22, 2010], then PG&E will submit a separate license amendment request to implement the approved generic change within 6 months of approval of the TSTF Traveler. This is a regulatory commitment as defined by [Nuclear Energy Institute] NEI 99-04.

The licensee committed to complete the above commitment within 6 months of the approval of TSTF-513. TSTF-513, Revision 3, was approved on January 3, 2011 (76 FR 189). The NRC staff has reviewed the final TSTF and concluded the proposed LAR meets the intent of the TSTF except for Condition E, which has been denied. As such, the NRC staff concludes that this commitment is not needed for the approval of this LAR.

5.0 STATE CONSULTATION

In accordance with the Commission's regulations, the California State official was notified of the proposed issuance of the amendments. The State official had no comments.

6.0 ENVIRONMENTAL CONSIDERATION

The amendments change a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration and there has been no public comment on such finding published in the *Federal Register* on August 25, 2009 (74 FR 42928). Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9) and 10 CFR 51.22(c)(10). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

7.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributors: J. Tsao
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A. Wang

Date: January 24, 2011

The NRC staff has concluded that the amendment meets the intent of TSTF-513 except for proposed changes to Condition E, which is denied and, therefore, the regulatory commitment regarding TSTF-513 is not needed for approval of this amendment.

A copy of the related safety evaluation is enclosed. The Notice of Issuance will be included in the Commission's next regular biweekly *Federal Register* notice.

Sincerely,

/RA/

Alan Wang, Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-275 and 50-323

Enclosures:
1. Amendment No. 209 to DPR-80
2. Amendment No. 211 to DPR-82
3. Safety Evaluation

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U.S. NUCLEAR REGULATORY COMMISSION

NON-CONCURRENCE PROCESS

SECTION A - TO BE COMPLETED BY NON-CONCURRING INDIVIDUAL

TITLE OF DOCUMENT	ADAMS ACCESSION NO.
Diablo Canyon - Issuance of Amendment to Technical Specification 3.4.15, RCS Leakage	**ML1020100840**
DOCUMENT SPONSOR	SPONSOR PHONE NO.
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REASONS FOR NON-CONCURRENCE

Summary

Incorporation of proposed amendment to Diablo Canyon Technical Specification 3.4.15[1] would result in a reduction in the margin of safety at the facility. This change would allow Pacific Gas and Electric to operate Diablo Canyon for periods up to seven days without the minimum reactor coolant system (RCS) leak detection capability required by the Leak-Before-Break (LBB) safety analysis. Approval this amendment would also establish a new agency precedent for defining Technical Specification components as "operable" when these components are not capable of performing the intended safety function as described in the plant safety analysis.

Current Requirements

Regulatory Guide 1.45,[2] Position C.5, established part of the Diablo Canyon RCS leak detection licensing basis commitment for meeting General Design Criteria (GDC) 30, "Quality of Reactor Coolant Pressure Boundary." Position C.5, established the requirement that containment atmospheric gaseous and particulate radiation monitors have the capability of detecting a one gallon per minute (gpm) RCS leak, within one hour, using a "realistic primary coolant radioactivity source term." Technical Specification 3.4.15 required these and other RCS leakage detection components to be "operable" during reactor operation. At Diablo Canyon the specified safety function of these leakage detection systems includes providing plant operators with an early indication of potential pressure boundary leakage between the 72 hours performance of the RCS inventory balance required by Technical Specification Surveillance 3.4.13, "RCS Operational Leakage.[3]" Technical Specification 3.4.15 prohibits continued reactor operation without at least one operable RCS leakage detection system.

Pacific Gas and Electric incorporated the LBB pipe fracture mechanics technology into the plant design bases.[4] The LBB technology provided the basis for reducing the number of RCS piping supports, resolution of Unresolved Safety Issue A-2, "Asymmetric Blowdown Loads on PWR Primary Systems," and meeting GDC 4, "Environmental and Dynamic Effects Design Bases."[5] The LBB NRC safety evaluation specified that licensees are required to maintain RCS leakage detection systems equivalent to Regulatory Guide 1.45 to use the LBB technology.[6] For plants that are not committed to Regulatory Guide 1.45 , the LBB safety analysis required licensees to maintain at least one RCS leak detection system with the capability of detecting a one gpm leak in four hours available at all times.[7] These requirements insured that plant operators would have sufficient time to shutdown the reactor before a RCS leak propagated into a pipe break. The integrity of this key safety requirement was preserved by Technical Specification 3.4.15, "RCS Leakage Detection Instrumentation."[8] Technical Specification 3.4.15 currently prohibits continued reactor operation without at least one operable RCS leakage detection system.

(Continued)

☑ CONTINUED IN SECTION D

SIGNATURE	DATE
Michael Peck	*August 15, 2010*

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Past Containment Gaseous Radiation Monitor Operability Issues

In 2003, the NRC identified that the gaseous radiation monitors used for RCS leakage detection at the Byron and Braidwood plants were not capable of performing the specified safety function.[9] The Agency concluded that Byron and Braidwood gas monitors would need between 223 and 839 hours before the components could detect a one gpm RCS leak using a "realistic" primary coolant radioactivity source term. In 2003 the NRC also concluded that the Callaway gaseous RCS leak detector was inoperable because more than 500 hours would be needed before the detector could detect a one gpm leak at current RCS activity levels.[10] The NRC subsequently identified that the gaseous monitors at Wolf Creek,[11] Diablo Canyon,[12] and Mcguire[13] were also inoperable. In each of these cases, the NRC concluded that the gaseous monitors were inoperable for Technical Specification 3.4.15 compliance because the leak detectors were not capable of detecting a RCS leak within a reasonable period of time, consistent with the plant safety analysis. The inspectors determined that the gaseous monitor design response and sensitivities were based on an assumed RCS source term equivalent to about 0.1 percent failed nuclear fuel. This assumed RCS source term was several orders of magnitude greater than "realistic" RCS activity specified by Regulatory Guide 1.45. The NRC inspectors concluded that none of these plants had ever operated with the RCS source term assumed in the monitor design and that current performance standards would likely result in a reactor shutdown long before 0.1 percent fuel failure would occur. Applying NRC operability guidance,[14] Agency inspectors concluded that monitors were inoperably because they were not capable to function as creditable leak detectors at current RCS conditions.

In 2005, the NRC issued Information Notice 2005-24[15] to alert licensees that the RCS activity assumed in the containment radiation atmospheric monitor design calculations may be non-conservative. The Agency concluded that individual monitor response and sensitivity was dependant on plant specific factors, including placement of detector inlet in relation to RCS piping, RCS source term, if RCS argon injection was used, containment size, and containment ventilation flow distribution (mixing). Information Notice 2005-24 also reinforced that atmospheric monitor operability was dependant on the capability of the monitor to perform the specified safety function to detect a RCS leak consistent with the current licensing basis.

Changes Proposed to Diablo Canyon Technical Specifications – Reduction in the Margin to Safety

The proposed at Diablo Canyon amendment provides for two changes, that when taken together, result in a reduction in the margin of safety for the facility. First, the amendment includes a "clarification" to the Base of Technical Specification 3.4.15"

> *"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 of that assumed in the design calculations for the monitors."*

Agency approval of this statement would allow Pacific Gas and Electric to credit containment radiation monitors as operable RCS leak detectors independent of the capability of these components to detect an actual RCS leak. The Diablo Canyon current detector design calculations[16] assume a much higher RCS source term than the licensee has or is likely to operate at. Amendment approval would result in the licensee to declare these components "operable" without an expectation that the components are capable of performing the specified safety function to alert plant operators to increases in RCS leakage between RCS water balances.

The proposed new Amendment Condition D would result in a reduction in the margin of safety at Diablo Canyon. Approval of Condition D would allow continued reactor operation for seven days with only the gaseous containment monitor "operable." The new Condition D along with the Technical Specification Bases "clarification" would result in reactor operation without any RCS leak detection capability. Reactor operation without at least one RCS leak detection system (with a one gpm within four hour capability) would place the plant outside the bounds of the NRC LBB safety analysis assumstions.[17]

(Continued)

NON-CONCURRENCE PROCESS

TITLE OF DOCUMENT	ADAMS ACCESSION NO.
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SECTION D: CONTINUATION PAGE

CONTINUATION OF SECTION ☑ A ☐ B ☐ C

Approval of the Diablo Canyon Amendment would also establish a new Agency precedent by permitting licensees to credit nonfunctional equipment as "operable." This position is contrary to current agency operability guidance.[17] This guidance specifies that:

> *A system, subsystem, train, component, or device shall be OPERABLE or have OPERABILITY when it is capable of performing its specified safety function(s) and when all necessary attendant instrumentation, controls, normal or emergency electrical power, cooling and seal water, lubrication, and other auxiliary equipment that are required for the system, subsystem, train, component, or device to perform its specified safety function(s) are also capable of performing their related support function(s).*

Pacific Gas and Electric Failed to Provide Adequate Technical Justification for the Use of Containment Atmosphere Grab Samples for RCS Leak Detection

The proposed Amendment justified the seven day Limiting Condition for Operation D, in part, by requiring licensees to analyze containment atmosphere grab samples once every 12 hours. Use of atmosphere grab samples is not an NRC approved method for RCS leak detection[18] and the 12 hour period is greater than maximum permitted time for detection of a one gallon per minute RCS leak in the LBB safety analysis. In addition, the licensee did not provide an adequate technical justification that grab samples were effective method for RCS leakage detection.

Containment grab samples may be taken from the upper containment deck when the containment atmosphere sampling system is out of service. The critical piping affected by the LBB analysis is remotely located in the lower containment, within the confines of the biological shield and crane walls. For containment grab samples to effectively identify RCS leakage, the coolant source term and leak rate must be sufficient to raise gaseous or particulate radiation levels above minimum detection limits at the location the grab sample is taken.

For gaseous grab samples, licensee uses a four liter sample bottle filled by a mechanical air pump. Xe^{133} is a typical Diablo Canyon dominant RCS gaseous nuclide. RCS Xe^{133} concentrations are often less than $7x10^{-4}$ µCi/ml. A 60 gallon leak (one gpm over an hour) would release about $2.2x10^{5}$ ml (or 160 µCi) into containment from the RCS. Diablo Canyon is a large, dry, PWR containment with about $2.5x10^{6}$ Ft^3 ($7.1 x10^{10}$ ml) free space. The resulting increase in Xe^{133} in the containment atmosphere would be about $2.21x10^{-9}$ µCi/ml, assuming instantaneous containment air mixing. This Xe^{133} value is lower than the $1x10^{-8}$ µCi/ml level of detection use for analyzing grab samples.[19] Actual expected radionuclide concentrations at the upper containment deck could be significantly less due to mixing resident time in the containment:

$$[N_{\text{sample point}}]/dt = d[N_{\text{leak}}]/dt \,/\, [_{\text{Containment Volume}}] * d\,[_{\text{mixing}}]/dt$$

Where N is radionuclide concentration, dt is time differential and $d[_{\text{mixing}}]/dt$ corresponds to the time dependant diffusion/forced convection of the RCS leak location to sample point.

Given that containment coolers circulate about 110,000 scfm, about a third radionuclide concentration would be seen at the upper containment deck after one hour when compared to the instantaneous mixing case.

For particulate grab samples, licensee will count a filter after passing about 30 ft^3 of containment atmosphere using a low volume air pump. A major contributor to RCS particulate concentration is Co^{58} or Cs^{138}. A typical Diablo Canyon RCS concentration for Co^{58} or Cs^{138} is about $2x10^{-3}$ µCi/ml. Applying the same approach used for the gaseous grab sample, 60 gallons of RCS would result in about $6.3x10^{-9}$ µCi/ml in containment assuming instantaneous mixing. This Co^{58} value is also lower than the $1x10^{-8}$ µCi/ml level of detection used for grab samples.[20] Actual radionuclide particulate concentrations at the upper containment deck would also be less due to mixing resident time in the containment:

(Continued)

NON-CONCURRENCE PROCESS

TITLE OF DOCUMENT	ADAMS ACCESSION NO.
Diablo Canyon - Issuance of Amendment to Technical Specification 3.4.15, RCS Leakage	**ML1020100840**

SECTION D: CONTINUATION PAGE

CONTINUATION OF SECTION ☑ A ☐ B ☐ C

$$d[N_{sample\ point}]/dt = d[N_{leak}]/dt / [_{Containment\ Volume}] * d [_{mixing}]/dt - d[N_{plate\ out}]/dt$$

In addition to the transport terms, additional containment atmospheric particulates would be lost due to plate-out on the cooler surfaces in the lower containment surfaces and in the containment cooling cooler coils.

Proposed Alternative

1. Recommend that the Agency not approve the Diablo Canyon Amendment.

2. Recommend additional renegotiation with the licensee to:

   - Remove the "clarification" to Technical Specification 3.4.15 Basis which provides for crediting nonfunctional equipment as "operable." Removal of this change from the amendment would still permit the use of radiation monitors for RCS leak detection if the licensee demonstrates that the components can met the safety function to detect an RCS leak given actual RCS source terms.

   - Specify that atmospheric grab sample analysis results are required to be completed every four hours while operating in Condition D. This change would provide consistency with the LBB safety analysis.

   - Included provisions in the Technical Specification Basis to ensure Pacific Gas and Electric complete a analysis, including the applicable ranges of RCS source terms and containment design and equipment alignments and transport times, demonstrating containment atmospheric grab samples have the capability to detect a one gpm RCS leak within four hours.

References

1. Diablo Canyon Power Plant, Unit Nos. 1 and 2 - Issuance of Amendments Re: Revision to Technical Specification 3.4.15 Reactor Coolant System Leakage Detection Instrumentation (Tac No. Me1644 And Me1645), ADAMS ML1020100840
2. Regulatory Guide 1.45, "Guidance on Monitoring and Responding to Reactor Coolant System Leakage, Revision 0
3. NUREG-0800, U.S. Nuclear Regulatory Commission Standard Review Plan, Section 5.2.5, "Reactor Coolant Pressure Boundary Leakage Detection," Revision 2
4. Technical Specification Bases 3.4.15, Reactor Coolant System Leakage Detection Instrumentation, Amendments 169 & 170
5. NUREG-1061, Volume 3, "Report of the U.S. Nuclear Regulatory Commission Piping Review Committed, Evaluation of Potential for Pipe Breaks, November," 1984
6. NUREG-0800, U.S. Nuclear Regulatory Commission Standard Review Plan, 3.6.3, "Leak-Before Break Evaluation Procedures," Revision, 1
7. Generic Letter 84-04, "Safety Evaluation of Westinghouse Topical Reports Dealing with Elimination of Postulated Pipe Breaks In PWR Primary Main Loops"
8. Ibid 4 and NUREG 1430
9. Letter to J.L. Skolds, Exelon Nuclear, February 20, 2003, from L. Raghavan, NRR, "Resolution of Allegation NRR-2002-A0022"
10. Callaway Plant - NRC Integrated Inspection Report 05000483/2003005,October 16, 2003 (ADAEMS ML032890770)
11. Wolf Creek Generating Station - NRC Integrated Inspection Report 05000482/2004004 November 9, 2004 (ADAMS ML0431402790)
12. Diablo Canyon Power Plant - NRC Integrated Inspection Report 05000275/2008004 AND 05000323/2008004 November 3, 2008, (ADAMS ML0830801130)
13. Mcguire Nuclear Station - NRC Integrated Inspection Report 05000369/2005002 And 05000370/2005002 And Independent Spent Fuel Storage Installation Inspection Report 0720038/20050001 (ADAMS ML051190140)
14. RIS 2005-20, Revision to NRC Inspection Manual Part 9900 Technical Guidance, "Operability Determinations & Functionality Assessments for Resolution of Degraded or Nonconforming Conditions Adverse to Quality or Safety". Revision 1
15. NRC INFORMATION NOTICE 2005-24, "Nonconservatism in Leakage Detection Sensitivity," August 3, 2005
16. Diablo Canyon FSAR Section 5.2.7, Reactor Coolant Pressure Boundary Detection System, Amendment 18
17. Ibid 13
18. Ibid 2, 3, & 5
19. Discussion with Diablo Canyon Chemistry Supervisor on May 13, 2010
20. Ibid 19

NRC FORM 757
NRC MD 10.158
(3-2009)

U.S. NUCLEAR REGULATORY COMMISSION

NON-CONCURRENCE PROCESS

TITLE OF DOCUMENT	ADAMS ACCESSION NO.
Diablo Canyon - Issuance of Amendment to Technical Specification 3.4.15, RCS Leakage	**ML1020100840**

SECTION B - TO BE COMPLETED BY NON-CONCURRING INDIVIDUAL'S SUPERVISOR
(THIS SECTION SHOULD ONLY BE COMPLETED IF SUPERVISOR IS DIFFERENT THAN DOCUMENT SPONSOR.)

NAME
Geoff Miller

TITLE	PHONE NO.
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ORGANIZATION
Projects Branch B, Division of Reactor Projects, RIV

COMMENTS FOR THE DOCUMENT SPONSOR TO CONSIDER

☐ I HAVE NO COMMENTS

☒ I HAVE THE FOLLOWING COMMENTS

I SUPPORT DR. PECK'S USE OF THE NONCONCURRENCE PROCESS, AND I AGREE THAT THE PROPOSED TS CHANGE SHOULD DOCUMENT HOW IT IS CONSISTENT WITH THE LBB SAFETY ANALYSIS, OR OTHERWISE PROVIDE THE TECHNICAL BASIS FOR ACCEPTABLE RISK

☐ CONTINUED IN SECTION D

SIGNATURE	DATE
	9/25/10

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NON-CONCURRENCE PROCESS

TITLE OF DOCUMENT	ADAMS ACCESSION NO.
Diablo Canyon - Issuance of Amendment to Technical Specification 3.4.15, RCS Leakage ...	**ML1020100840**

SECTION C - TO BE COMPLETED BY DOCUMENT SPONSOR

NAME	
Alan Wang	
TITLE Project Manager	**PHONE NO.** 301-415-1445
ORGANIZATION Plant Licensing Branch IV, Division of Reactor Licensing, NRR	

ACTIONS TAKEN TO ADDRESS NON-CONCURRENCE (This section should be revised, as necessary, to reflect the final outcome of the non-concurrence process, including a complete discussion of how individual concerns were addressed.)

Pacific Gas and Electric Company (PG&E, the licensee) was issued a non-cited violation 05000275/2008004-03, for performing an inadequate operability evaluation of the Diablo Canyon Power Plant (DCPP), Unit 1 containment atmosphere gaseous radioactivity monitor of the reactor coolant leak detection system. The NRC is addressing the containment atmosphere gaseous radioactivity monitoring system issue in an integrated fashion by: (i) working with the TSTF to develop revised generic TS for the monitoring system, and facilitating licensee implementation of the revised generic TS through a streamlined license amendment process; and (ii) using guidance on NRC's exercise of enforcement discretion involving inoperable containment atmosphere gaseous radioactivity monitoring systems issued in EGM-09-001 (ADAMS Accession No. ML090300467). To address this issue, the industry working through the industry-sponsored Technical Specifications Task Force (TSTF) have submitted TSTF-513, "Revise Operability Requirements and Actions for RCS Leakage Instrumentation," to the NRC for review. On May 8, 2009, the NRC staff issued Regulatory Information Summary (RIS) 2009-02, "Use Of Containment Atmosphere Gaseous Radioactivity Monitors As Reactor Coolant System Leakage Detection Equipment At Nuclear Power Reactors."

The RIS stated that TSTF-513 proposes generic TS changes for PWRs and licensees are free to submit LARs to address the issue using TSTF-513 or they can propose alternative solutions. In response to the violation the PG&E proposed to revise, via an amendment, TS 3.4.15 and its Bases to describe the required response time of the leakage detection instruments. PG&E's proposed LAR is similar to draft TSTF-513 but reflects DCPP plant-specific licensing bases design.

On May 17, 2010, Mr. Peck (NRC senior resident inspector (SRI)) non-concurred on the draft TSTF 513. On August 15, 2010, Michael Peck non-concurred on the proposed the DCPP specific license amendment request (LAR) on TS 3.4.15. In his non-concurrence of this amendment he stated that:

> **The proposed at Diablo Canyon amendment provides for two changes, that when taken together, result in a reduction in the margin of safety for the facility. First, the amendment includes a "clarification" to the Base of Technical Specification 3.4.15"**
>
> > **"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 of that assumed in the design calculations for the monitors."**

☑ CONTINUED IN SECTION D

SIGNATURE - DOCUMENT SPONSOR	DATE	SIGNATURE - DOCUMENT SIGNER	DATE
Alan Wang	1/5/11	Michael T. Peck	1/21/11

NON-CONCURRING INDIVIDUAL *(To be completed by document sponsor* when process is complete, i.e., after document is signed):

- ☐ CONCURS
- ☐ NON-CONCURS
- ☐ WITHDRAWS NON-CONCURRENCE (i.e., discontinues process)
- ☒ WANTS NCP FORM PUBLIC
- ☐ WANTS NCP FORM NON-PUBLIC

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(3-2009)

U.S. NUCLEAR REGULATORY COMMISSION

NON-CONCURRENCE PROCESS

TITLE OF DOCUMENT	ADAMS ACCESSION NO.
Diablo Canyon - Issuance of Amendment to Technical Specification 3.4.15. RCS Leakage...	

SECTION D: CONTINUATION PAGE

CONTINUATION OF SECTION ☐ A ☐ B ☑ C

Continuation of Section C on Attached Pages.

☑ Continuation of Section C

Agency approval of this statement would allow Pacific Gas and Electric to credit containment radiation monitors as operable RCS leak detectors independent of the capability of these components to detect an actual RCS leak. The Diablo Canyon current detector design calculations[16] assume a much higher RCS source term than the licensee has or is likely to operate at. Amendment approval would result in the licensee to declare these components "operable" without an expectation that the components are capable of performing the specified safety function to alert plant operators to increases in RCS leakage between RCS water balances.

The proposed new Amendment Condition D would result in a reduction in the margin of safety at Diablo Canyon. Approval of Condition D would allow continued reactor operation for seven days with only the gaseous containment monitor "operable." The new Condition D along with the Technical Specification Bases "clarification" would result in reactor operation without any RCS leak detection capability. Reactor operation without at least one RCS leak detection system (with a one gpm within four hour capability) would place the plant outside the bounds of the NRC LBB safety analysis assumptions.

Approval of the Diablo Canyon Amendment would also establish a new Agency precedent by permitting licensees to credit nonfunctional equipment as "operable." This position is contrary to current agency operability guidance.[17] This guidance specifies that:

> A system, subsystem, train, component, or device shall be OPERABLE or have OPERABILITY when it is capable of performing its specified safety function(s) and when all necessary attendant instrumentation, controls, normal or emergency electrical power, cooling and seal water, lubrication, and other auxiliary equipment that are required for the system, subsystem, train, component, or device to perform its specified safety function(s) are also capable of performing their related support function(s).

Based on the above, Mr. Peck has recommended the following:

1. the Agency not approve the Diablo Canyon Amendment.

2. renegotiate with the licensee to:

   a) Remove the "clarification" to Technical Specification 3.4.15 Basis which provides for crediting nonfunctional equipment as "operable." Removal of this change from the amendment would still permit the use of radiation monitors for RCS leak detection if the licensee demonstrates that the components can met the safety function to detect an RCS leak given actual RCS source terms,

   b) Specify that atmospheric grab sample analysis results are required to be completed every four hours while operating in Condition D. This change would provide consistency with the LBB safety analysis, and

☑ Continuation from Section C 2

c) Included provisions in the Technical Specification Basis to ensure Pacific Gas and Electric complete a analysis, including the applicable ranges of RCS source terms and containment design and equipment alignments and transport times, demonstrating containment atmospheric grab samples have the capability to detect a one gpm RCS leak within four hours.

The NRC staff published TSTF-513 (76 FR 189; January 3, 2011) after considering comments from Mr. Peck. While Mr. Peck's comments did result in some changes to the TSTF-513, Mr. Peck maintained that his main concerns regarding his non-concurrence of the TSTF-513 were not addressed. Mr. Peck consequently non-concurred on this amendment which is based on TSTF-513. The NRC staff has reviewed the proposed changes by PG&E for this amendment and concluded that they are consistent with the TSTF-513 except for Condition E, which was denied. The NRC staff has concluded that the comments provided on this amendment by Mr. Peck, which are similar to his comments on the TSTF-513, have been addressed with the approval of the TSTF-513. Provided below is a discussion addressing the points he made:

The approval of the Bases changes are discussed in Section 3.3.6. In addition, RIS 2009-02 provides some insights to this issue and Mr. Peck's concerns:

> Improvements in fuel cladding integrity and RCS chemistry controls result in lower RCS radioactivity concentrations during operational activities, including situations where there is RCS leakage. Thus, containment atmosphere gaseous radioactivity monitoring systems which are designed on the basis of higher assumed RCS radioactivity concentrations may not provide accurate indication of RCS leakage in the required length of time due to the longer response time of the monitoring system. If this occurs each licensee must determine the operability of their gaseous radioactivity monitoring system based on their plant-specific licensing basis. The NRC considers the longer response times of the containment atmosphere gaseous radioactivity monitors to be of very low safety significance. The monitors would still be able to detect degradation in the RCPB long before components fail in a manner that would affect plant safety. Additionally, plants also have multiple diverse and redundant methods available to detect RCS leakage and to provide licensees with a means to detect significant RCPB degradation and to take appropriate action to ensure the continued protection of public health and safety. Finally, nuclear power plants are designed to provide adequate core cooling following postulated loss-of-coolant accidents up to and including a break equivalent in size to the double-ended rupture of the largest pipe in the RCS. This design feature, coupled with the extremely low likelihood of unstable crack growth resulting in a loss-of-coolant accident, leads the NRC to conclude that the risk significance of this issue is very low.

The NRC acknowledges that the operability of the containment atmospheric radiation monitors as defined as result of this amendment will be for an environment which does not currently exist (i.e., .1 percent failed fuel). Because the activity levels are so much lower than that assumed in the design Bases calculation for the gaseous radiation monitor, which is the least sensitive of the multiple leakage detection systems, the NRC staff had decided to have a new condition added to TS 3.4.15 to address the gaseous radiation monitor separately. As such the proposed

TS has added a new condition D for the case where the containment atmosphere gaseous radioactivity monitor is the only operable monitor. This new Condition D adds the following more conservative actions to TS 3.4.15:

a) Current TS 3.4.15 with only the gaseous radiation monitor operable would allow up to 30 days to restore one of the other leakage detection systems. New Condition D would require restoration of one of the other leakage detection systems in 7 days.
b) Current TS 3.4.15 with only the gaseous radiation monitor operable requires that grab samples of the containment atmosphere be made once per 24 hours. New Condition D would require grab samples be made every 12 hours.

Mr. Peck has noted that the performing the grab sample analysis every 12 hours is inconsistent with the LBB safety analysis. When the containment atmosphere gaseous radiation monitor is the only Operable monitor, the current TSs require performance of SR 3.4.13.1 (mass balance) once per 24 hours and restoration of the inoperable sump monitor within 30 days. The proposed change in addition to requiring the mass balance, will require analyzing grab samples from the containment atmosphere and modify the restoration of at least one additional monitor from within 30 days to within 7 days. The RCS mass balance is sensitive enough to detect a one gpm leak rate in one hour and is the primary method used to verify compliance with the RCS leakage limits. However, an RCS mass balance calculation requires a relatively lengthy period of steady state operation to provide accurate results. The ability to perform grab sampling during periods of power change is desirable and provides an additional compensatory method to the currently required RCS mass balance. A containment grab sample is comparable to the containment particulate radiation monitor with respect to the ability to detect RCS leakage. Due to the time to take and analyze the grab sample, this is not a continuous monitoring method. However, by reducing the time between grab samples there will be no significant loss of monitoring capability during the limited time period allowed by the proposed change. The 12 hour (once per shift) performance of containment grab samples is reasonable given the availability of the containment atmosphere gaseous radiation monitor. The 7 day Completion Time to restore another monitor is reasonable given the diverse methods available to detect an RCS leak and the low probability of a large RCS leak during this period. Therefore, increasing grab sample frequency would add no value to the Required Actions and may distract operators. Requiring the grab samples is done specifically because it is recognized that a 1 GPM leak may not be recognized in 1 hour.

Most licensees have been licensed for LBB. The basic concept of LBB is that certain piping material has sufficient fracture toughness (i.e., ductility) to resist rapid flaw propagation. A postulated flaw in such piping would not lead to pipe rupture and potential damage to adjacent safety related systems, structures and components before the plant could be placed in a safe, shutdown condition. Before pipe rupture, the postulated flaw would lead to limited but detectable leakage which would be identified by the leak detection systems in time for the operator to take action. The NRC staff reviews the application of LBB methodology to primary system piping to ensure that certain safety margins are satisfied to assure the structural integrity of the pipe. There is significant conservatism in this evaluation. SRP Section 3.6.3 specifies a margin of the square-root of 2 be applied to the loads to assure that leakage size flaws are stable at the normal load plus safe-shutdown earthquake load. A margin of 10 is to be applied to leakage so that detection of leakage from the postulated flaw size is ensured when the pipe is subjected to normal operational loads. In addition, the critical flaw size should be twice as large

as the leakage flaw size (i.e., a margin of 2 on leakage flaw size). The proposed actions for inoperable RCS leakage detection instrumentation maintain sufficient continuity and diversity of RCS leakage detection capability that an extremely low probability of undetected RCS leakage leading to pipe rupture is maintained. Therefore, with appropriate controls, the grab samples every 12 hours constitute an effective remedial measure to detect coolant leakage.

In addition, Condition A has been revised from:

> "Required containment sump monitors inoperable" to "Any containment sump monitor inoperable."

This clarifies the Condition A such that if either of the two containment structure sumps or the reactor cavity sump level and monitoring system is inoperable LCO 3.4.15a is not met. This is a conservative Action as it would be unusual that all three sumps are inoperable at the same time. The plant has reviewed it operating experience and has found no occurrences of all 3 sump instrumentation being inoperable at the same time except for a brief period of time during yearly maintenance.

The revised LCO Bases does define a criterion for the operability of the monitors based on the original design calculations. This statement in the TS bases is a restatement of the licensing basis. The licensing basis only required using the RCS radioactivity concentration assumed in the design calculations. Another example of where the Bases reflect the requirements for operability is with current licensee TS 3.1.4 LCO Bases discussion of the requirements for operability for the control rods where it is stated the rod OPERABILITY requirement is satisfied provided the rod will fully insert in the required time assumed in the safety analyses and that rod control malfunctions that result in the inability to move a rod (e.g., rod lift coil failures), but do not impact trippability, do not necessarily result in rod inoperability. Again the NRC understands that the actual RCS radioactivity concentration is now much lower than originally assumed and this adversely affects how quickly the containment gaseous activity monitor would detect small RCS leaks. The proposed changes to the TS Bases are acceptable because they define, consistent with the design basis of the facility, the minimum set of diverse instruments that must be operable, the plant parameters monitored by the instrumentation, the design sensitivity of the leakage detection instruments, and factors that affect the operational sensitivity of the instrument.

The NRC staff does not have any evidence that the monitors are not operable and in this case the licensee has performed calculations to provide realistic gaseous and particulate radiation monitor responses for RCS leakage with the current low level of RCS radionuclides. In addition, as noted in the RIS 2009-02, there are three required leakage detection systems which provide multiple diverse and redundant methods available to detect RCS leakage. In addition, the TS RCS water inventory balance as well as several non-TS systems can be used to detect RCS leakage including: volume control tank level, pressurizer level and charging pump flow.

The NRC staff believes that it is the combination of all three diverse leakage detection systems that provides the maximum potential for early detection of a leak. Some licensees in response to the gaseous radiation monitor concerns have obtained license amendments to remove the gaseous radiation monitors from their TS (including Byron, Braidwood, Callaway, Wolf Creek, & McGuire), reducing their leakage detection systems to two instruments. The NRC staff does not believe this is the best way to address this problem. In addition, as previously stated, the

changes require more frequent monitoring of the containment atmosphere via grab samples when the containment atmosphere gaseous radioactivity monitor is the only operable RCS leakage detection instrument and a shorter completion time to restore other leakage detection systems. The NRC staff feels that this is the appropriate approach to address the issue by requiring operators to perform more frequent monitoring of the containment atmosphere via grab samples when the containment atmosphere gaseous radioactivity monitor is the only operable monitor to ensure early identification and detection of an RCS leak such that leak before break assumptions are maintained.