

January 19, 2007

Mr. John S. Keenan
Senior Vice President and Chief Nuclear Officer
Pacific Gas and Electric Company
Diablo Canyon Power Plant
P.O. Box 770000
San Francisco, CA 94177-0001

SUBJECT: DIABLO CANYON POWER PLANT, UNIT NOS. 1 AND 2 - ISSUANCE OF
AMENDMENTS RE: TECHNICAL SPECIFICATION 1.1 DEFINITIONS AND
TECHNICAL SPECIFICATION 3.4.16 REACTOR COOLANT SYSTEM
SPECIFIC ACTIVITY (TAC NOS. MC9671 AND MC9672)

Dear Mr. Keenan:

The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment No. 192 to Facility Operating License No. DPR-80 and Amendment No. 193 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 your application dated January 25, 2006.

The amendments revise TS 1.1, "Definitions," and TS 3.4.16, "RCS [Reactor Coolant System] Specific Activity." The amendment replaces the current TS 3.4.16 limit on RCS gross-specific activity with a new limit on RCS noble gas-specific activity. The noble gas-specific activity limit is based on a new dose equivalent Xe-133 definition that would replace the current E-Bar average disintegration energy definition. In addition, the current dose equivalent I-131 definition is revised to allow the use of alternate thyroid dose conversion factors.

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. 192 to DPR-80
2. Amendment No. 193 to DPR-82
3. Safety Evaluation

cc w/encls: See next page

January 19, 2007

Mr. John S. Keenan
Senior Vice President and Chief Nuclear Officer
Pacific Gas and Electric Company
Diablo Canyon Power Plant
P.O. Box 770000
San Francisco, CA 94177-0001

SUBJECT: DIABLO CANYON POWER PLANT, UNIT NOS. 1 AND 2 - ISSUANCE OF AMENDMENTS RE: TECHNICAL SPECIFICATION 1.1 DEFINITIONS AND TECHNICAL SPECIFICATION 3.4.16 REACTOR COOLANT SYSTEM SPECIFIC ACTIVITY (TAC NOS. MC9671 AND MC9672)

Dear Mr. Keenan:

The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment No. 192 to Facility Operating License No. DPR-80 and Amendment No. 193 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 your application dated January 25, 2006.

The amendments revise TS 1.1, "Definitions," and TS 3.4.16, "RCS [Reactor Coolant System] Specific Activity." The amendment replaces the current TS 3.4.16 limit on RCS gross-specific activity with a new limit on RCS noble gas-specific activity. The noble gas-specific activity limit is based on a new dose equivalent Xe-133 definition that would replace the current E-Bar average disintegration energy definition. In addition, the current dose equivalent I-131 definition is revised to allow the use of alternate thyroid dose conversion factors.

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. 192 to DPR-80
2. Amendment No. 193 to DPR-82
3. Safety Evaluation

cc w/encls: See next page

DISTRIBUTION:

PUBLIC	RidsOgcRp	RidsNrrDorIDpr
LPLIV Reading	RidsNrrPMAWang	GHill
RidsNrrDirsltsb	RidsNrrLALFeizollahi	JParillo, NRR
RidsNrrDorl (CHaney/JLubinski)	RidsAcrsAcnwMailCenter	
RidsNrrDorlLpl4 (DTerao)	RidsRgn4MailCenter	

ADAMS Accession No.: Package ML063450364 (Amendment ML063450372, License/TS Pgs ML070190214)

OFFICE	NRR/LPL4/PM	NRR/LPL4/LA	ADRA/AADB/BC	OGC-NLO w/comments	NRR/LPL4/BC
NAME	AWang	LFeizollahi	MKotzalas	AHodgdon	DTerao
DATE	1/5/07	1/3/07	10/27/06	1/17/07	1/18/07

OFFICIAL RECORD COPY

Diablo Canyon Power Plant, Units 1 and 2

cc:

NRC Resident Inspector
Diablo Canyon Power Plant
c/o U.S. Nuclear Regulatory Commission
P.O. Box 369
Avila Beach, CA 93424

Sierra Club San Lucia Chapter
ATTN: Andrew Christie
P.O. Box 15755
San Luis Obispo, CA 93406

Ms. Nancy Culver
San Luis Obispo
Mothers for Peace
P.O. Box 164
Pismo Beach, CA 93448

Chairman
San Luis Obispo County
Board of Supervisors
1055 Monterey Street, Suite D430
San Luis Obispo, CA 93408

Mr. Truman Burns
Mr. Robert Kinoshian
California Public Utilities Commission
505 Van Ness, Room 4102
San Francisco, CA 94102

Diablo Canyon Independent Safety
Committee
ATTN: Robert R. Wellington, Esq.
Legal Counsel
857 Cass Street, Suite D
Monterey, CA 93940

Regional Administrator, Region IV
U.S. Nuclear Regulatory Commission
Harris Tower & Pavillion
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011-8064

Richard F. Locke, Esq.
Pacific Gas & Electric Company
P.O. Box 7442
San Francisco, CA 94120

City Editor
The Tribune
3825 South Higuera Street
P.O. Box 112
San Luis Obispo, CA 93406-0112

Director, Radiologic Health Branch
State Department of Health Services
P.O. Box 997414, MS 7610
Sacramento, CA 95899-7414

Mr. James D. Boyd, Commissioner
California Energy Commission
1516 Ninth Street (MS 31)
Sacramento, CA 95814

Mr. James R. Becker, Vice President
Diablo Canyon Operations
and Station Director
Diablo Canyon Power Plant
P.O. Box 56
Avila Beach, CA 93424

Jennifer Tang
Field Representative
United States Senator Barbara Boxer
1700 Montgomery Street, Suite 240
San Francisco, CA 94111

March 2006

PACIFIC GAS AND ELECTRIC COMPANY

DOCKET NO. 50-275

DIABLO CANYON NUCLEAR POWER PLANT, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 192
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 January 25, 2006, 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.

3. This license amendment is effective as of its date of issuance and shall be implemented within 90 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

David Terao, Chief
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment: Changes to the Facility
Operating License and
Technical Specifications

Date of Issuance: January 19, 2007

PACIFIC GAS AND ELECTRIC COMPANY

DOCKET NO. 50-323

DIABLO CANYON NUCLEAR POWER PLANT, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 193
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 January 25, 2006, 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.

3. This license amendment is effective as of its date of issuance and shall be implemented within 90 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

David Terao, Chief
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment: Changes to the Facility
Operating License and
Technical Specifications

Date of Issuance: January 19, 2007

ATTACHMENT TO LICENSE AMENDMENT NO. 192
TO FACILITY OPERATING LICENSE NO. DPR-80
AND AMENDMENT NO. 193 TO FACILITY OPERATING LICENSE NO. DPR-82
DOCKET NOS. 50-275 AND 50-323

Replace each page 3 of the Facility Operating Licenses, License Nos. DPR-80 and No. DPR-82, with their respective attached revised page 3.

Replace the following pages of the 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.

REMOVE

1.1-3

3.4-35
3.4-36
3.4-37

INSERT

1.1-3
1.1-3a
3.4-35
3.4-36

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 192 TO FACILITY OPERATING LICENSE NO. DPR-80
AND AMENDMENT NO. 193 TO FACILITY OPERATING LICENSE NO. DPR-82
PACIFIC GAS AND ELECTRIC COMPANY
DIABLO CANYON POWER PLANT, UNITS 1 AND 2
DOCKET NOS. 50-275 AND 50-323

1.0 INTRODUCTION

By application dated January 25, 2006 (Agencywide Documents Access and Management System Accession No. ML060390359), Pacific Gas and Electric Company (the licensee) requested changes to the Technical Specifications (Appendix A to Facility Operating License Nos. DPR-80 and DPR-82) for the Diablo Canyon Power Plant, Units 1 and 2 (DCPP).

The proposed amendments would revise Technical Specification (TS) 1.1, "Definitions," and TS 3.4.16, "RCS [Reactor Coolant System] Specific Activity." Specifically, the proposed changes would revise the current TS 3.4.16 limit on RCS gross-specific activity with a new limit on RCS noble gas-specific activity. The noble gas-specific activity limit will be based on a new dose equivalent Xe-133 (DEX) definition that would replace the current E-Bar average disintegration energy definition. In addition, the current dose equivalent I-131 (DEI) definition will be revised to allow the use of alternate thyroid dose conversion factors (DCFs).

2.0 REGULATORY EVALUATION

The U.S. Nuclear Regulatory Commission (NRC) staff evaluated the impact of the proposed changes as they relate to the radiological consequences of affected design-basis accidents (DBAs) that use the RCS inventory as the source term. The source term assumed in radiological analyses should be based on the activity associated with the projected fuel damage or the maximum TS RCS values, whichever maximizes the radiological consequences. The limits on RCS-specific activity ensure that the offsite doses are appropriately limited for accidents that are based on releases from the RCS with no significant amount of fuel damage.

The steam generator tube rupture (SGTR) accident and the main steamline break (MSLB) accident typically do not result in fuel damage and, therefore, the radiological consequence analyses are based on the release of primary coolant activity at the maximum TS limits. For accidents that result in fuel damage, the additional dose contribution from the initial activity in the RCS is not normally evaluated and is considered to be insignificant in relation to the dose resulting from the release of fission products from the damaged fuel.

For licensees that incorporate the source term as defined in Technical Information Document (TID) 14844, U.S. Atomic Energy Commission (AEC), 1962, "Calculation of Distance Factors for Power and Test Reactors Sites," in their dose consequence analyses, the NRC staff uses the regulatory guidance provided in NUREG-0800, "Standard Review Plan (SRP) for the Review of Safety Analysis Reports for Nuclear Power Plants," Section 15.1.5, "Steam System Piping Failures Inside and Outside of Containment (PWR) [Pressurized-Water Reactor]," Appendix A, "Radiological Consequences of Main Steam Line Failures Outside Containment," Revision 2, for the evaluation of MSLB accident analyses and NUREG-0800, SRP Section 15.6.3, "Radiological Consequences of Steam Generator Tube Failure," Revision 2, for evaluating SGTR accidents analyses. In addition, the NRC staff uses the guidance from Regulatory Guide (RG) 1.195, "Methods and Assumptions for Evaluating Radiological Consequences of Design Basis Accidents at Light-Water Nuclear Power Reactors," May 2003, for those licensees that choose to use its guidance for dose consequence analyses using the TID 14844 source term.

The applicable dose criteria for the evaluation of DBAs depends on the source term incorporated in the dose consequence analyses. For licensees using the TID 14844 source term, the maximum dose criteria to the whole body and the thyroid that an individual at the exclusion area boundary can receive for the first 2 hours following an accident, and at the low population zone outer boundary for the duration of the radiological release, are specified in Title 10 of the *Code of Federal Regulations* (10 CFR) Section 100.11. These criteria are 25 roentgen equivalent man (rem) total whole-body dose and 300 rem thyroid dose from iodine exposure. The accident dose criteria in 10 CFR 100.11 is supplemented by accident-specific dose acceptance criteria in SRP 15.1.5, Appendix A, SRP 15.6.3 or Table 4 of RG 1.195.

For control room dose consequence analyses that use the TID 14844 source term, the regulatory requirement for which the NRC staff bases its acceptance is General Design Criterion (GDC) 19 of Appendix A to 10 CFR Part 50, "Control room." GDC 19 requires that adequate radiation protection be provided to permit access and occupancy of the control room under accident conditions without personnel receiving radiation exposures in excess of 5 rem whole body, or its equivalent to any part of the body, for the duration of the accident. NUREG-0800, SRP Section 6.4, "Control Room Habitability System," Revision 2, July 1981, provides guidelines defining the dose equivalency of 5 rem whole body as 30 rem for both the thyroid and skin dose. For licensees adopting the guidance from RG 1.196, "Control Room Habitability at Light-Water Nuclear Power Reactors," May 2003, Section C.4.5 of RG 1.195, May 2003, states that in lieu of the dose equivalency guidelines from Section 6.4 of NUREG-0800, the 10 CFR 20.1201 annual organ dose limit of 50 rem can be used for both the thyroid and skin dose equivalent of 5 rem whole body.

3.0 TECHNICAL EVALUATION

3.1 Background

The primary coolant-specific activity level is used in DBA analyses to determine the radiological consequences of accidents that involve the release of primary coolant activity with no substantial amount of fuel damage. For events that also include significant amounts of fuel damage, the contribution from the initial activity in the primary coolant is considered insignificant and is not normally evaluated.

The maximum allowable primary coolant-specific activity is governed by TSs. Due to the importance of iodine in the dose consequence analyses, a separate limit is specified for the iodine isotopes. This limit is specified in units of DEI, which is the normalized quantity of iodine 131 that would result in the same dose consequence as the combination of the major isotopes of iodine present in the primary coolant. The TS for DEI includes both an equilibrium long-term limit as well as a higher maximum allowable short-term limit to account for iodine spiking. Typically, the TSs for PWRs allow for increases in the maximum allowable spiking limit as a linear function of decreasing power level from 80 to 20 percent of rated thermal power (RTP). A typical short-term DEI limit of 60 microcuries per gram ($\mu\text{Ci}/\text{gm}$) would by TS be constant from 100 percent to 80 percent rated thermal power (RTP) but allowed to increase to as high as 300 $\mu\text{Ci}/\text{gm}$ at 20 percent RTP. The dose consequence analyses typically do not consider these allowable increases in DEI values at lower power levels.

The current standard TS definition of DEI is based on thyroid DCFs and reflects a licensing model in which the radiological consequences of iodine releases for accidents are reported as thyroid and whole-body doses. The numerical determination of DEI is dependent on the relative quantities of the isotopes of iodine present in the RCS and on the DCFs used in the calculation. The TS definition of DEI typically lists acceptable sources for the thyroid DCFs to be used in the determination of DEI. It is incumbent on the licensee to ensure that the DCFs used in the determination of DEI are consistent with the DCFs used in the dose consequence analyses.

A second limit is used to govern the non-iodine radioisotopes in the RCS. This limit has traditionally been based on an evaluation of the average beta and gamma disintegration energy of the total non-iodine activity in the RCS which is referred to as E-Bar. The standard TS defines E-Bar as the average (weighted in proportion to the concentration of each radionuclide in the reactor coolant at the time of sampling) of the sum of the average beta and gamma energies per disintegration for isotopes, other than iodines, with half-lives greater than 15 minutes, making up at least 95 percent of the total non-iodine activity in the coolant. The RCS non-iodine-specific activity limit is then expressed as the quantity 100 divided by E-Bar expressed in units of $\mu\text{Ci}/\text{gm}$. In DBA dose consequence analyses based on releases from the RCS with no significant fuel damage, the concentration of noble gas activity in the coolant is assumed to be that level associated with 1 percent fuel-clad defects. Operating experience has indicated that, depending on the isotopes used to calculate E-Bar and the actual degree of fuel-clad defects, the routinely calculated value of E-Bar may not be an effective indicator of the level of noble gas activity relative to the levels used in the DBA dose consequence analyses on which the limit is based.

3.2 Technical Evaluation of RCS TS Changes

3.2.1 Revision to the Definition of DEI

The licensee has proposed to expand the list of acceptable DCFs for use in the determination of DEI to include several sources all of which are approved for use by the NRC. The list of acceptable sources for DCFs is as follows:

1. Table III of TID 14844, AEC, 1962.

2. Table E-7 of RG 1.109, Revision 1, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix J," NRC, 1977.
3. International Commission on Radiological Protection Publication 30, 1979, pages 192-212, Table titled "Committed Dose Equivalent in Target Organs or Tissues per Intake of Unit Activity."
4. Table 2.1 of Environmental Protection Agency Federal Guidance Report No. 11, 1988, "Limiting Values of Radionuclide Intake and Air Concentration and Dose Conversion Factors for Inhalation, Submersion, and Ingestion."

As previously stated, it is incumbent on the licensee to ensure that the DCFs used in the determination of DEI are consistent with the DCFs used in the applicable dose consequence analyses. This change will allow the licensee to calculate DEI using the same DCFs as are used in the dose consequence analyses and is, therefore, acceptable.

3.2.2 Deletion of the Definition of E-Bar and the Addition of a New Definition for Dose Equivalent Xe-133

The licensee has proposed to eliminate the term E-Bar and to govern the non-iodine RCS activity by incorporating a new term referred to as dose equivalent Xe-133, or DEX. The new definition for DEX is similar to the definition for DEI. The determination of DEX will be performed in a similar manner to that currently used in determining DEI, except that the calculation of DEX is based on the acute dose to the whole body and considers the noble gases Kr-85m, Kr-87, Kr-88, Xe-133m, Xe-133, Xe-135m, Xe-135, and Xe-138 which are significant in terms of contribution to whole-body dose. The licensee has determined that these isotopes account for approximately 98 percent of the whole-body dose from noble gases in the accident analysis. If a specified noble-gas nuclide is not detected, the new definition states that it should be assumed the nuclide is present at the minimum detectable activity. This will result in a conservative calculation of DEX.

The licensee asserts, and the NRC staff agrees, that when E-Bar is determined using a design-basis approach in which it is assumed that 1.0 percent of the power is being generated by fuel rods having cladding defects, and it is also assumed that there is no removal of fission gases from the letdown flow, the value of E-Bar is dominated by Xe-133. The other nuclides have relatively small contributions. However, during normal plant operation, there are typically only a small number of fuel-clad defects and the radioactive nuclide inventory can become dominated by tritium and corrosion and or activation products, resulting in the determination of a value of E-Bar that is very different than would be calculated using the design-basis approach. Because of this difference, the accident dose analyses become disconnected from plant operation and the limiting condition for operation (LCO) becomes essentially meaningless. It also results in a TS limit that can vary during operation as different values for E-Bar are determined.

The licensee asserts, and the NRC staff agrees, that this change will implement an LCO that is consistent with the whole-body radiological consequence analyses that are sensitive to the noble gas activity in the primary coolant but not to other, non-gaseous activity currently

captured in the E-Bar definition. LCO 3.4.16 specifies the limit for primary coolant gross-specific activity as 100/E-Bar $\mu\text{Ci}/\text{gm}$. The current E-Bar definition includes radioisotopes that decay by the emission of both gamma and beta radiation. The licensee asserts, and the NRC staff agrees, that the current Condition B of LCO 3.4.16 would rarely, if ever, be entered for exceeding 100/E-Bar since the calculated value is very high (the denominator is very low) if beta emitters such as tritium are included in the determination, as required by the E-Bar definition.

The licensee proposes to delete the TS Section 1.1 definition for E - AVERAGE DISINTEGRATION ENERGY (E-Bar) and replace it with a new definition for DEX which states:

DOSE EQUIVALENT XE-133 shall be that concentration of Xe-133 (microcuries per gram) that alone would produce the same acute dose to the whole body as the combined activities of noble gas nuclides Kr-85m, Kr-87, Kr-88, Xe-133m, Xe-133, Xe-135m, Xe-135, and Xe-138 actually present. If a specific noble gas nuclide is not detected, it should be assumed to be present at the minimum detectable activity. The determination of DOSE EQUIVALENT XE-133 shall be performed using effective dose conversion factors for air submersion listed in Table III.1 of EPA Federal Guidance Report No. 12, 1993, "External Exposure to Radionuclides in Air, Water, and Soil."

The proposed change incorporating the newly defined quantity DEX is acceptable since it will result in an LCO that more closely relates the non-iodine RCS activity limits to the dose consequence analyses that form their bases. It is incumbent on the licensee to ensure that the DCFs used in the determination of DEI and the newly defined DEX are consistent with the DCFs used in the applicable dose consequence analyses.

3.2.3 Revision of TS 3.4.16 LCO RCS-Specific Activity

The licensee proposes to modify LCO 3.4.16 to specify that iodine-specific activity in terms of DEI and noble gas-specific activity in terms of DEX shall be within limits. Currently, the limit indicators are not explicitly identified in the LCO, but are instead defined in current Condition B and Surveillance Requirement (SR) 3.4.16.1 for gross non-iodine-specific activity and in current Condition A and SR 3.4.16.2 for iodine-specific activity.

The proposed change states "RCS DOSE EQUIVALENT 1-131 and DOSE EQUIVALENT XE-133 specific activity shall be within limits."

The DEI limit $1.0 \mu\text{Ci}/\text{gm}$ is retained as contained in current Condition A and SR 3.4.16.2. The licensee states that the limit of $1.0 \mu\text{Ci}/\text{gm}$ is consistent with the current SGTR and MSLB radiological consequence analyses. The licensee states that the DEX limit of $600 \mu\text{Ci}/\text{gm}$ as contained in the revised SR 3.4.16.1 is more limiting than the value in the current SGTR and MSLB radiological consequences. The NRC staff performed an independent calculation of DEX based on the isotopic values provided in the DCP final safety analysis report (FSAR) Update Table 15.5-67, "Noble gas-specific Activities in the Reactor Coolant Based on 1% Fuel Defects - SGTR Analysis." The results of the evaluation confirm the licensee's assertion that the proposed DEX limit of $600 \mu\text{Ci}/\text{gm}$ is bounded by the specific activity values used in the applicable dose consequence analyses and is, therefore, acceptable.

3.2.4 TS 3.4.16 Applicability Revision

The licensee has proposed to modify the TS 3.4.16 Applicability to include all of Mode 3 and Mode 4. The licensee asserts, and the NRC staff agrees, that it is necessary for the LCO to apply during Modes 1 through 4 to limit the potential radiological consequences of an SGTR or MSLB that may occur during these modes. The licensee asserts, and the NRC staff agrees, that in Modes 5 and 6, the steam generators are not used for decay-heat removal, the RCS and steam generators are depressurized, and primary-to-secondary leakage is minimal. Therefore, the monitoring of RCS-specific activity during Modes 5 and 6 is not required. The proposed change to modify the TS 3.4.16 Applicability to include all of Mode 3 and Mode 4 is necessary to limit the potential radiological consequences of an SGTR or MSLB that may occur during these modes and is, therefore, acceptable.

3.2.5 TS 3.4.16 Condition A Revision

The licensee has proposed to revise TS 3.4.16 Condition A by replacing the limit "> 1.0 $\mu\text{Ci/gm}$ " with the words "not within limit" to be consistent with the revised TS 3.4.16 LCO format. The DEI limit of $\leq 1.0 \mu\text{Ci/gm}$ is contained in SR 3.4.16.2. This change will maintain the consistency of the proposed TS and is acceptable.

3.2.6 TS 3.4.16 Required Action A.1 Revision

The licensee has proposed to revise TS 3.4.16 Required Action A.1 to remove the reference to Figure 3.4.16-1 and insert a limit of less than or equal to 60 $\mu\text{Ci/gm}$ for DEI. The curve contained in Figure 3.4.16-1 was initiated by the AEC in a June 12, 1974, letter from the AEC on the subject, "Proposed Standard Technical Specifications for Primary Coolant Activity." The licensee's radiological consequence analyses for SGTR and MSLB accidents that take into account the pre-accident iodine spike do not consider the elevated RCS iodine-specific activities permitted by current TS Figure 3.4.16-1 for operation at power levels below 80-percent RTP. Instead, the pre-accident iodine spike analyses assume a DEI concentration 60 times higher than the corresponding long-term equilibrium value, which corresponds to the 60 $\mu\text{Ci/gm}$ -specific activity limit associated with 100-percent RTP operation. Therefore, the NRC staff agrees with the licensee that TS 3.4.16 Required Action A.1 should be based on a limit of $\leq 60 \mu\text{Ci/gm}$ to be consistent with the assumptions contained in the radiological consequence analyses.

3.2.7 TS 3.4.16 Condition B Revision to Include Action for DEX Limit

The licensee has proposed to replace the current TS 3.4.16 Condition B with a new Condition B for DEX not within limits. This change is made to be consistent with the change to the TS 3.4.16 LCO that requires the DEX-specific activity to be within limits as discussed above. The DEX limit of 600 $\mu\text{Ci/gm}$ is contained in revised SR 3.4.16.1. The limit of 600 $\mu\text{Ci/gm}$ is established based on the maximum accident analysis RCS activity corresponding to 1-percent fuel-clad defects with sufficient margin to accommodate the exclusion of those isotopes based on low concentration, short half-life, or small-dose conversion factors. The primary purpose of the TS 3.4.16 LCO on RCS-specific activity and its associated conditions is to support the dose

analyses for DBAs. The whole-body dose is primarily dependent on the noble gas activity, not the non-gaseous activity currently captured in the E-Bar definition and limited by current TS 3.4.16 Condition B.

The proposed Completion Time (CT) for revised TS 3.4.16 Required Action B.1 will require restoration of DEX to within limit in 48 hours. This is consistent with the CT for current Required Action A.2 for DEI. The radiological consequences for the SGTR and the MSLB accidents, as documented in FSAR Update Section 15.5.18.1 and FSAR Update Table 15.5-71, demonstrate that the calculated thyroid doses are a greater percentage of the applicable acceptance criteria than the calculated whole-body doses. The NRC staff agrees with the licensee that it then follows that the CT for noble gas activity being out of specification in the revised Required Action B.1 should be at least as great as the CT for iodine-specific activity being out of specification in current Required Action A.2. Therefore the CT of 48 hours for revised Required Action B.1 is acceptable from a radiological dose perspective.

3.2.8 TS 3.4.16 Condition C Revision

The licensee has proposed to revise TS 3.4.16 Condition C to include Condition B (DEX not within limit) if the Required Action and associated CT of Condition B is not met. This is consistent with the changes made to Condition B, which now provides the same CT for both components of RCS-specific activity as discussed in the revision to Condition B. The proposed revision to Condition C also replaces the limit on DEI from the deleted Figure 3.4.16-1 with a value of greater than 60 $\mu\text{Ci/gm}$. This change makes Condition C consistent with the changes made to TS 3.4.16 Required Action A.1.

The proposed change to TS 3.4.16 Required Action C.1 requires the plant to be in Mode 3 within 6 hours and adds a new Required Action C.2 which requires the plant to be in Mode 5 within 36 hours. These changes are consistent with the changes made to the TS 3.4.16 Applicability. The revised LCO is applicable throughout all of Modes 1 through 4 to limit the potential radiological consequences of an SGTR or MSLB that may occur during these modes. The NRC staff agrees with the licensee that in Modes 5 and 6, the steam generators are not used for decay-heat removal, the RCS and steam generators are depressurized, and the primary-to-secondary leakage is minimal. Therefore, the monitoring of RCS-specific activity during Modes 5 and 6 is not required.

The licensee has proposed a new TS 3.4.16 Required Action C.2 CT of 36 hours for the plant to reach Mode 5. The NRC staff agrees with the licensee that this CT is reasonable, based on operating experience, to reach Mode 5 from full-power conditions in an orderly manner and without challenging plant systems. The licensee further states that the value of 36 hours is consistent with other TS which have a CT to reach Mode 5.

3.2.9 SR 3.4.16.1 Revision to Include Surveillance for DEX

The proposed change replaces the current SR 3.4.16.1 surveillance for RCS gross-specific activity with a surveillance to verify that the reactor coolant DEX-specific activity is $\leq 600 \mu\text{Ci/gm}$. This change provides a surveillance for the new LCO limit added to TS 3.4.16 for DEX. The revised SR 3.4.16.1 surveillance requires performing a gamma isotopic analysis as a measure of the noble gas-specific activity of the reactor coolant at least once every 7 days,

which is the same frequency required under the current SR 3.4.16.1 surveillance for RCS gross-specific activity. The surveillance provides an indication of any increase in the noble gas-specific activity. The licensee asserts, and the staff agrees, that the results of the surveillance on DEX allow proper remedial action to be taken before reaching the LCO limit under normal operating conditions.

The licensee has proposed to modify SR 3.4.16.1 by inclusion of a note which permits the use of the provisions of LCO 3.0.4.c. This allowance permits entry into the applicable mode(s) while relying on the actions. This allowance is acceptable due to the significant conservatism incorporated into the specific activity limit, the low probability of an event that is limiting due to exceeding this limit, and the ability to restore transient-specific activity excursions while the plant remains at, or proceeds to, power operation. This allows entry into Mode 4, Mode 3, and Mode 2 prior to performing the surveillance. This allows the surveillance to be performed in any of those modes, prior to entering Mode 1, similar to the current surveillance SR 3.4.16.2 for DEI.

3.2.10 SR 3.4.16.3 Deletion

As previously discussed, the licensee has proposed to delete the current SR 3.4.16.3 which required the determination of E-Bar. The proposed TS 3.4.16 LCO on RCS-specific activity supports the dose analyses for DBAs, in which the whole-body dose is primarily dependent on the noble gas concentration, not the non-gaseous activity currently captured in the E-Bar definition. The NRC staff agrees with the licensee that with the elimination of the limit for RCS gross-specific activity and the addition of the new LCO limit for noble gas-specific activity, this SR to determine E-Bar is no longer required.

3.3 Precedent

The TS developed for the Westinghouse AP600 and AP1000 advanced reactor designs incorporate an LCO for RCS DEX activity in place of the LCO on gross-specific activity based on E-Bar. This approach was approved by the NRC for the AP600 in NUREG-1512, "Final Safety Evaluation Report Related to the Certification of the AP600 Standard Design, Docket No. 52-003," dated August 1998 and for the AP1000 in the NRC letter to Westinghouse Electric Company dated September 13, 2004. In addition, the curve describing the maximum allowable iodine concentration during the 48-hour period of elevated activity as a function of power level was not included in the TS approved for the AP600 and AP1000 advanced reactor designs.

3.4 Summary of TS Changes

The NRC staff has reviewed the proposed amendment to revise the definition of DEI, delete the definition of E-Bar, add a new definition for DEX, revise TS 3.4.16 to specify an LCO limit on DEI, add a new LCO limit to TS 3.4.16 for DEX, increase the CT of Required Action B.1, delete TS Figure 3.4.16-1, and revise the TS 3.4.16 Conditions and Required Actions accordingly. In addition, the staff has reviewed the change in the Applicability of LCO 3.4.16 to reflect the modes during which the SGTR and MSLB accidents could be postulated to occur, the revision of SR 3.4.16.1 to verify DEX is within the prescribed limit, and the deletion of SR 3.4.16.3.

The NRC staff has concluded that the proposed changes will not impact the dose consequences of the applicable DBAs because the proposed changes will limit the RCS noble gas-specific activity to ensure consistency with the values assumed in the radiological consequence analyses. In addition, the changes will also limit the potential RCS iodine concentration excursion to the value currently associated with full-power operation, which is more restrictive on plant operation than the existing allowable RCS iodine-specific activity at lower power levels. Therefore, the NRC staff finds that the proposed TS changes are acceptable.

4.0 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.

5.0 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 and change a surveillance requirement. 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 (71 FR 13176). 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.

6.0 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 Contributor: J. Parillo

Date: January 19, 2007