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PG&E Letter DCL-06-079

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

Docket No. 50-323, OL-DPR-82
Diablo Canyon Unit 2

10 CFR 50.46 Emergency Core Cooling System Evaluation Model Changes

Dear Commissioners and Staff:

Pursuant to 10 CFR 50.46, this letter provides a 30-day report of changes in the Westinghouse emergency core cooling system (ECCS) evaluation models that affect peak cladding temperature (PCT) calculations for Diablo Canyon Power Plant, Unit 2. These PCT margin allocations have been made due to two reactor vessel design changes, which have been implemented during the Unit 2 thirteenth refueling outage.

The Upflow Conversion (UC) design change converted the Unit 2 reactor vessel from a downflow barrel/baffle configuration to an upflow configuration, while the Upper Head Temperature Reduction (UHTR) design change reduced the upper head temperature to a value corresponding to the Reactor Coolant System cold leg temperature (T_{cold}). Because the absolute value of the sum of these new PCT margin allocations exceeds 50°F, they can be considered "significant" in accordance with 10 CFR 50.46. The UC design change resulted in a 17°F and a 40°F decrease in the best estimate large-break loss-of-coolant accident (BELOCA) PCT results for the Reflood 1 period and the Reflood 2 period, respectively. The UHTR design change resulted in a 159°F and a 124°F decrease in the BELOCA PCT results for the Reflood 1 period and the Reflood 2 period, respectively. These PCT changes are with respect to the last annual report submitted via Pacific Gas and Electric (PG&E) Letter DCL-05-086, dated July 25, 2005.

There has been no change in the Unit 1 BELOCA PCT results and the small-break loss-of-coolant accident (SBLOCA) PCT results for Units 1 and 2 also remain unchanged as presented in DCL-05-086. The summary of the updated Unit 2 PCT margin allocations and their bases are provided in the enclosure.

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The new Unit 2 PCT values remain within the 2200°F limit specified in 10 CFR 50.46. The Unit 2 BELOCA PCT Margin Utilization Sheets are provided in Attachment A of the enclosure. The ECCS evaluation model changes that have resulted in the new PCT margin allocation are summarized in Attachment B.

As discussed in the enclosed report, PG&E has performed a plant-specific reanalysis for Unit 2 using the accepted methodology established in WCAP-12945-P-A, "Code Qualification Document for Best Estimate LOCA Analysis," dated 1998, and WCAP-16009-P-A, "Realistic Large-Break LOCA Evaluation Methodology Using the Automated Statistical Treatment Uncertainty Method (ASTRUM)," dated 2005. This reanalysis explicitly incorporates the Unit 2 reactor vessel design changes and has been submitted for NRC review in PG&E Letter DCL-06-006, "10 CFR 50.46 License Amendment Request 06-02 Revision to Technical Specification 5.6.5, 'Core Operating Limits Report (COLR),' " dated March 2, 2004. PG&E will update these DCP Unit 2 BELOCA analysis-of-record PCT values after the Technical Specification revision is approved.

If there are any questions regarding this report, please contact Mr. Mark Mayer of my staff at (805) 545-4674

Sincerely,

Donna Jacobs
Vice President, Nuclear Services

ddm/2254/A0642916

Enclosure

cc: Diablo Distribution
cc/enc: Edgar Bailey, DHS
Terry W. Jackson, NRC Senior Resident Inspector
Bruce S. Mallett, NRC Region IV
Alan B. Wang, NRR Project Manager

30-DAY REPORT OF EMERGENCY CORE COOLING SYSTEM EVALUATION MODEL CHANGES THAT AFFECT PEAK CLADDING TEMPERATURE

Pursuant to 10 CFR 50.46, this enclosure provides a 30-day report of changes in the Westinghouse emergency core cooling system (ECCS) evaluation model that affects peak cladding temperature (PCT) calculations for Diablo Canyon Power Plant (DCPP), Unit 2. This report is based on changes described in the following Westinghouse 10 CFR 50.46 notification letter:

Westinghouse Letter PGE-05-67, dated September 9, 2005, "Transmittals of Draft WCAP-16443-P and 10 CFR 50.46 Margin Tracking Sheets"

Attachment A to this enclosure provides DCPP Unit 2 best estimate large-break loss-of-coolant accident (BELOCA) PCT Margin Utilization Sheets. These PCT margin allocations have been made due to two reactor vessel design changes, which have been implemented during the Unit 2 thirteenth refueling outage (2R13). The Upflow Conversion (UC) design change converted the Unit 2 reactor vessel from a downflow barrel/baffle configuration to an upflow configuration, while the Upper Head Temperature Reduction (UHTR) design change reduced the upper head temperature to a value corresponding to the Reactor Coolant System (RCS) cold leg temperature (T_{cold}). The UC design change resulted in a 17°F and a 40°F decrease in the BELOCA PCT results for the Reflood 1 period and the Reflood 2 period, respectively. The UHTR design change resulted in a 159°F and a 124°F decrease in the BELOCA PCT results for the Reflood 1 period and the Reflood 2 period, respectively. These PCT changes are assessments against the PCT values contained in the last annual report submitted in Pacific Gas and Electric (PG&E) Letter DCL-05-086, dated July 25, 2005. There has been no change in the Unit 1 BELOCA PCT results, and the small-break loss-of-coolant accident (SBLOCA) PCT results for Unit 1 and Unit 2 also remain unchanged from the information presented in DCL-05-086. A detailed summary of the ECCS evaluation model changes that have resulted in this new PCT margin allocation are summarized in Attachment B.

PG&E has performed a plant-specific reanalysis for Unit 2 using the accepted methodology established in WCAP-12945-P-A, "Code Qualification Document for Best Estimate LOCA Analysis," dated 1998, and WCAP-16009-P-A, "Realistic Large-Break LOCA Evaluation Methodology Using the Automated Statistical Treatment Uncertainty Method (ASTRUM)," dated 2005. This re-analysis explicitly incorporates the Unit 2 reactor vessel design changes and has been submitted for NRC review in the PG&E Letter DCL-06-006, "10 CFR 50.46 License Amendment Request 06-02 Revision to Technical Specification 5.6.5, 'Core Operating Limits Report (COLR),' " dated March 2, 2004. PG&E will update these DCPP Unit 2 BELOCA analysis-of-record PCT values after the Technical Specification revision is approved.

The final net Unit 2 BELOCA PCT values that are reflected in Attachments A are listed below. It should be noted that two PCT values are reported for the BELOCA consistent with the current Westinghouse PCT tracking methodology. The two BELOCA PCT values are labeled Reflood 1 and Reflood 2, as they represent the two distinct PCT peaks that occur during the reflood phase.

Best Estimate Large-Break Loss-of-coolant Accident

	Reflood 1	Reflood 2
Unit 2:	1805°F	1805°F

DCPP UNIT 2 PEAK CLADDING TEMPERATURE MARGIN UTILIZATION

<u>BEST ESTIMATE LARGE-BREAK LOCA</u>				<u>PG&E Letter¹</u>
		Reflood 1	Reflood 2	
A.	ANALYSIS OF RECORD	1976°F	1964°F	DCL-00-107
		<u>ΔPCT</u>	<u>ΔPCT</u>	
B.	PERMANENT 10 CFR 50.46 ECCS MODEL ASSESSMENTS ²			
	1. Revised blowdown heatup uncertainty distribution	5°F	5°F	DCL-05-086
	2. Upflow Conversion (UC)	-17°F	-40°F	
	3. Upper Head Temperature Reduction (UHTR)	-159°F	-124°F	
C.	10 CFR 50.59 AND 10 CFR 50.92 SAFETY EVALUATIONS			
	1. None	0°F	0°F	
D.	OTHER MARGIN ALLOCATIONS			
	1. None	0°F	0°F	
	LICENSING BASIS PCT + MARGIN ALLOCATION PCT	1805°F	1805°F	

¹ For those issues that have been previously reported under 10 CFR 50.46, a PG&E letter number is listed.

² Only permanent assessments of peak cladding temperature (PCT) margin are included. Temporary PCT allocations that address current loss-of-coolant accident (LOCA) model issues are not considered with respect to 10 CFR 50.46 reporting requirements.

**BEST ESTIMATE LARGE-BREAK LOSS-OF-COOLANT ACCIDENT (BELOCA)
Upflow Conversion (UC) and Upper Head Temperature Reduction (UHTR)
Evaluations**

The impact of the reactor vessel internals changes performed prior to Cycle 14 operation (prior to the Unit 2 thirteenth refueling outage) on the current licensing basis BELOCA analysis for Diablo Canyon Power Plant (DCPP) Unit 2 has been identified. The WCOBRA/TRAC input deck used in the Unit 2 analysis of record was modified first to model the conversion of the Unit 2 barrel baffle region to the upflow configuration. The detailed thermal hydraulic parameters associated with the modified barrel baffle region flow were modeled, and the reference transient was then executed using the current approved version of WCOBRA/TRAC. The Unit 2 input deck was then further modified to model the reduction in the upper head temperature to the T_{cold} condition, and again the reference transient was executed. In this way the impact of each plant modification was evaluated individually for the DCPP Unit 2 10 CFR 50.46 peak cladding temperature (PCT) margin utilization sheet.

The current DCPP Unit 2 licensing basis $PCT^{95\%}$ is reduced due to each of these plant changes. The UC leads to a 17°F decrease in the PCT during the Reflood 1 period, and the UHTR produces an additional 159°F decrease in the PCT during the Reflood 1 period. In addition, the conversion of the barrel baffle region to an upflow configuration leads to a 40°F decrease in the PCT during the Reflood 2 period, and the UHTR produces an additional 124°F decrease in the PCT during the Reflood 2 period.