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PG&E Letter DCL-03-091

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

Docket No. 50-275, OL-DPR-80
Docket No. 50-323, OL-DPR-82
Diablo Canyon Units 1 and 2
10 CFR 50.46 Annual Report of Emergency Core Cooling System Evaluation Model Changes

Dear Commissioners and Staff:

Pursuant to 10 CFR 50.46, this letter provides an annual report of changes in the Westinghouse emergency core cooling system evaluation models that affect peak cladding temperature (PCT) calculations for Diablo Canyon Power Plant (DCPP), Units 1 and 2. There has been no change in the small-break loss of coolant accident (SBLOCA) PCT results or evaluation model since the last annual report submitted via PG&E Letter DCL-02-089, dated July 26, 2002.

Per the commitment identified in PG&E Letter DCL-00-134, dated October 19, 2000, PG&E has performed a reanalysis for the best estimate large-break loss of coolant accident (BELOCA). The reanalysis was performed using the Westinghouse superposition step methodology, which is currently being reviewed (WCAP-12945 revision) by the NRC. The reanalysis will not be established as the analysis of record per 10 CFR 50.46 until after NRC acceptance of the methodology, which is anticipated later this year. However, the superposition step methodology represents an appropriate ECCS evaluation model for the purpose of performing PCT assessments and updating the PCT margin allocations for both DCPP Units 1 and 2.

The summary of the updated PCT margin allocations and their bases are provided in the enclosure, and the final net PCT values are listed below for each Unit.

It should be noted that two PCT values are reported for the BELOCA consistent with the current Westinghouse PCT tracking methodology. The 2 large-break PCT values are labeled Reflood 1 and Reflood 2, as they represent the 2 distinctive PCT peaks that occur during the reflood phase for the BELOCA methodology.

A001

Small-Break LOCA	Best Estimate Large-Break LOCA	
	Reflood 1	Reflood 2
Unit 1 (no change): 1317 °F	1976 °F	1964 °F
Unit 2 (no change): 1306 °F	1976 °F	1964 °F

The PCT values remain within the 2200°F limit specified in 10 CFR 50.46. The Unit 1 SBLOCA and BELOCA PCT Margin Utilization sheets are provided in Attachment A of the enclosure. The Unit 2 SBLOCA and BELOCA PCT Margin Utilization Sheets are provided in Attachment B of the enclosure.

PG&E will update the DCPP Unit 1 large break analysis of record PCT value once the NRC acceptance of the Westinghouse superposition step reanalysis methodology is obtained. Since acceptance is anticipated later this year, PG&E is also providing a draft Unit 1 PCT margin allocation sheet for information. This Unit 1 PCT margin allocation sheet is labeled "Pending Analysis of Record" and is provided in Attachment C of the enclosure. In addition, as discussed in the enclosed report, PG&E will perform a plant specific BELOCA analysis for Unit 2 using the accepted methodology established in WCAP-12945-P-A, "Code Qualification Document for Best Estimate LOCA Analysis," Bajorek, S. M. et. al., 1998. This analysis will be completed to support design changes to be implemented during the Unit 2 twelfth refueling outage, which is currently scheduled for the fall of 2004.

Sincerely,

James R. Becker
Vice President, DCPP Operations and Station Director

mjr/A0494471E2/R0236364
Enclosure
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ANNUAL REPORT OF EMERGENCY CORE COOLING SYSTEM EVALUATION MODEL CHANGES THAT AFFECT PEAK CLADDING TEMPERATURE

Pursuant to 10 CFR 50.46, this enclosure provides an annual 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 (DCPP), Units 1 and 2. This report is based on changes described in the following Westinghouse 10 CFR 50.46 notification letters:

Westinghouse Letter PGE-03-16, dated March 11, 2003, "Diablo Canyon Units 1 and 2, 10 CFR 50.46 Annual Notification and Reporting for 2002."

Westinghouse Letter PGE-03-33, dated June 6, 2003, "Diablo Canyon Unit 1 BELOCA Reanalysis Final Engineering Report."

Attachment A to this enclosure provides DCPP Unit 1 small-break loss of coolant accident (SBLOCA) and best estimate large-break loss of coolant accident (BELOCA) PCT Margin Utilization Sheets. Attachment B to this enclosure provides DCPP Unit 2 SBLOCA and BELOCA PCT Margin Utilization Sheets. There has been no change in the SBLOCA PCT results or evaluation model since the last annual report submitted via PG&E Letter DCL-02-089, dated July 26, 2002.

Per the commitment identified in PG&E Letter DCL-00-134, dated October 19, 2000, PG&E has performed a reanalysis for the BELOCA. The reanalysis was performed using the Westinghouse superposition step methodology, which is currently being reviewed (WCAP-12945 revision) by the NRC. The reanalysis will not be established as the analysis of record per 10 CFR 50.46 until after NRC acceptance of the methodology, which is anticipated later this year. However, the superposition step methodology represents an appropriate ECCS evaluation model for the purpose of performing PCT assessments and updating the PCT margin allocations for both DCPP Units 1 and 2.

PG&E will update the Unit 1 large-break analysis of record PCT value once the NRC acceptance of the Westinghouse superposition step reanalysis methodology is obtained. Since acceptance is anticipated later this year, PG&E is also providing a draft Unit 1 PCT margin allocation sheets for NRC information. This Unit 1 PCT margin allocation sheet is labeled "Pending Analysis of Record" and is provided as Attachment C to this enclosure.

It should also be noted that during the BELOCA reanalysis, Westinghouse identified that due to ECCS model changes, the Unit 2 PCT exceeded that of Unit 1 for several comparative cases. The current BELOCA analysis of record is based on a bounding plant methodology that established Unit 1 as the limiting plant, and the Unit 1 PCT results as bounding when applied to Unit 2.

Based on the reanalysis results with several comparative cases showing Unit 2 PCTs exceeding those of Unit 1, PG&E has determined that the bounding plant methodology is no longer appropriate for establishing the Unit 2 BELOCA analysis of record. Therefore, PG&E will perform a plant-specific BELOCA analysis for Unit 2 using the accepted methodology established in WCAP-12945-P-A, "Code Qualification Document for Best Estimate LOCA Analysis," Bajorek, S. M. et. al., 1998.

The Unit 2 BELOCA analysis will be completed in support of design changes to be implemented during the Unit 2 twelfth refueling outage. This outage is currently scheduled for the fall of 2004. These Unit 2 design changes include modifying the reactor vessel internals to provide baffle region core bypass flow in the upward direction instead of the current downward direction, and reducing the reactor coolant temperature in the upper head region.

In the interim period until the NRC approves the Westinghouse superposition step reanalysis methodology and the Unit 2 analysis is completed, an appropriately conservative PCT margin is established by maintaining the current analysis of record PCT value for DCPP Units 1 and 2. This is conservative since the comparative case results generated as part of the Unit 1 reanalysis show a significant decrease in the overall PCT values relative to the current analysis for both DCPP Units 1 and 2 when the appropriate code corrections and ECCS model changes are implemented. The Unit 1 final PCT at the ninety-fifth percentile is significantly reduced compared with the current value (1900 °F, reanalysis vs. 1976 °F, original analysis). The Unit 2 comparative case results indicate that the revised Unit 2 PCT at the ninety-fifth percentile will be comparably reduced. Therefore, the PCT results of the current analysis of record remain conservative for both DCPP Units 1 and 2.

The final net PCT values that are reflected in Attachments A and B 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 2 large-break PCT values are labeled Reflood 1 and Reflood 2, as they represent the 2 distinctive PCT peaks that occur during the reflood phase for the BELOCA methodology.

Small-Break LOCA	**Best Estimate Large-BreakBLOCA**	
	Reflood 1	Reflood 2
Unit 1 (no change): 1317 °F	1976 °F	1964 °F
Unit 2 (no change): 1306 °F	1976 °F	1964 °F

DCPP UNIT 1 PEAK CLADDING TEMPERATURE MARGIN UTILIZATION

SMALL-BREAK LOCA			PG&E Letter[1]
A. ANALYSIS OF RECORD	PCT =	1304°F	DCL-99-096
B. PERMANENT 10 CFR 50.46 ECCS MODEL ASSESSMENTS[2]			
1. NOTRUMP Mixture Level Tracking/Region Depletion Errors	ΔPCT =	13°F	DCL-00-107
C. 10 CFR 50.59 AND 10 CFR 50.92 SAFETY EVALUATIONS			
1. None	ΔPCT =	0°F	
D. OTHER MARGIN ALLOCATIONS			
1. None	ΔPCT =	0°F	

LICENSING BASIS PCT + MARGIN ALLOCATION PCT = 1317°F

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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 PCT margin are included. Temporary PCT allocations that address current LOCA model issues are not considered with respect to 10 CFR 50.46 reporting requirements.

DCPP UNIT 1 PEAK CLADDING TEMPERATURE MARGIN UTILIZATION

BEST ESTIMATE LARGE-BREAK LOCA	Reflood 1	Reflood 2	PG&E Letter[1]
A. ANALYSIS OF RECORD	1976°F	1964°F	DCL-00-107
	ΔPCT	ΔPCT	
B. PERMANENT 10 CFR 50.46 ECCS MODEL ASSESSMENTS[2]			
1. None	0°F	0°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	1976°F	1964°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 PCT margin are included. Temporary PCT allocations that address current LOCA model issues are not considered with respect to 10 CFR 50.46 reporting requirements.

DCPP UNIT 2 PEAK CLADDING TEMPERATURE MARGIN UTILIZATION

SMALL-BREAK LOCA			PG&E Letter[1]
A. ANALYSIS OF RECORD	PCT =	1293°F	DCL-99-096
B. PERMANENT 10 CFR 50.46 ECCS MODEL ASSESSMENTS[2]			
1. NOTRUMP Mixture Level Tracking/Region Depletion Errors	ΔPCT =	13 °F	DCL-00-107
C. 10 CFR 50.59 AND 10 CFR 50.92 SAFETY EVALUATIONS			
1. None	ΔPCT =	0 °F	
D. OTHER MARGIN ALLOCATIONS			
1. None	ΔPCT =	0 °F	

LICENSING BASIS PCT + MARGIN ALLOCATION PCT = 1306°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 PCT margin are included. Temporary PCT allocations that address current LOCA model issues are not considered with respect to 10 CFR 50.46 reporting requirements.

DCPP UNIT 2 PEAK CLADDING TEMPERATURE MARGIN UTILIZATION

BEST ESTIMATE LARGE-BREAK LOCA	Reflood 1	Reflood 2	PG&E Letter[1]
A. ANALYSIS OF RECORD	1976°F	1964°F	DCL-00-107
	ΔPCT	ΔPCT	
B. PERMANENT 10 CFR 50.46 ECCS MODEL ASSESSMENTS[2]			
1. None	0°F	0°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	1976°F	1964°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 PCT margin are included. Temporary PCT allocations that address current LOCA model issues are not considered with respect to 10 CFR 50.46 reporting requirements.

Pending Analysis of Record
DCPP UNIT 1 PEAK CLADDING TEMPERATURE MARGIN UTILIZATION

BEST ESTIMATE LARGE-BREAK LOCA

		Reflood 1	Reflood 2	
A.	ANALYSIS OF RECORD	1900°F	1860°F	Reference 1
		ΔPCT	ΔPCT	
B.	PERMANENT 10 CFR 50.46 ECCS MODEL ASSESSMENTS[2]			
	1. None	0°F	0°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		1900°F	1860°F	

Reference 1: Westinghouse Letter PGE-03-33, "Diablo Canyon Unit 1 BELOCA Reanalysis Final Engineering Report," June 6, 2003

Only permanent assessments of PCT margin are included. Temporary PCT allocations that address current LOCA model issues are not considered with respect to 10 CFR 50.46 reporting requirements.