



**Pacific Gas and
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PG&E Letter DCL-00-107

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
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 Units 1 and 2. There have been some changes or errors identified in the PCT calculations associated with the small break evaluation models since the last 30-day report submitted in PG&E Letter DCL-00-051, dated April 5, 2000. These model changes, along with the current PCT margin utilization, are provided in the enclosure. The PCT values are as follows:

	<u>Small-Break LOCA</u>	<u>Best Estimate LBLOCA</u>	
		Reflood 1	Reflood 2
Unit 1:	1317 °F	2009 °F (no change)	1964 °F (no change)
Unit 2:	1306 °F	2009 °F (no change)	1964 °F (no change)

The PCT values remain within the 2200°F limit specified in 10 CFR 50.46. As indicated in PG&E Letter DCL 99-096, dated July 26, 1999, PG&E proposes to perform reanalysis for large break LOCA within five years.

Sincerely,

David H. Oatley

cc: Steven D. Bloom
Ellis W. Merschoff
David L. Proulx
Diablo Distribution

Enclosure

ADD

ENCLOSURE

**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 letter:

- Westinghouse Letter PGE-00-525, dated June 30, 2000, "Diablo Canyon Units 1 and 2, 10 CFR 50.46 Appendix K (BART/BASH/NOTRUMP) Evaluation Model Mid-year Notification and Reporting for 2000."

Attachment A to this enclosure provides DCPP Unit 1 small-break and large-break PCT Margin Utilization Sheets. Attachment B to this enclosure provides DCPP Unit 2 small-break and large-break PCT Margin Utilization Sheets. These ECCS evaluation model changes for both Units 1 and 2 small-break loss-of-coolant accidents (LOCAs) represent changes from the last PG&E report DCL-00-051, dated April 5, 2000. The results of these PCT margin allocations are provided in Attachments A and B. The ECCS evaluation model changes that have resulted in new PCT margin allocations are provided in Attachment C.

As indicated in PG&E Letter DCL 99-096, dated July 26, 1999, PG&E proposes to perform reanalysis for large break LOCA within five years.

The PCT values that are calculated in Attachments A and B are listed below.

	<u>Small-Break LOCA</u>	<u>Best Estimate LBLOCA</u>	
		Reflood 1	Reflood 2
Unit 1:	1317 °F	2009 °F (no change)	1964 °F (no change)
Unit 2:	1306 °F	2009 °F (no change)	1964 °F (no change)

ATTACHMENT A

DCPP UNIT 1 PEAK CLADDING TEMPERATURE MARGIN UTILIZATION

SMALL-BREAK LOCA**PG&E Letter¹**

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	Δ PCT =	13°F	Attachment C
C.	10 CFR 50.59 AND 10 CFR 50.92 SAFETY EVALUATIONS			
	1. None	Δ PCT =	0°F	
D.	OTHER MARGIN ALLOCATIONS			
	1. None	Δ PCT =	0°F	

LICENSING BASIS PCT + MARGIN ALLOCATION PCT = 1317°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.

ATTACHMENT A

DCPP UNIT 1 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-99-096
B. PERMANENT 10 CFR 50.46 ECCS MODEL ASSESSMENTS ²	$\Delta PCT =$	$\Delta PCT =$	
1. Intercell Force Gap Numbering Error	33°F	67°F	DCL-98-101
2. Vessel Channel DX Error (1998)	0°F	-67°F	DCL-00-051
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	2009°F	1964°F	

ATTACHMENT B

DCPP UNIT 2 PEAK CLADDING TEMPERATURE MARGIN UTILIZATION**SMALL-BREAK LOCA****PG&E Letter¹**

- | | | | | |
|----|---|----------------|--------|--------------|
| 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 | Δ PCT = | 13 °F | Attachment C |
| C. | 10 CFR 50.59 AND 10 CFR 50.92
SAFETY EVALUATIONS | | | |
| | 1. None | Δ PCT = | 0 °F | |
| D. | OTHER MARGIN ALLOCATIONS | | | |
| | 1. None | Δ PCT = | 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. New issues are reported in Attachment C.

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.

ATTACHMENT B

DCPP UNIT 2 PEAK CLADDING TEMPERATURE MARGIN UTILIZATION

BEST ESTIMATE LARGE-BREAK LOCA**PG&E Letter¹**

	Reflood 1	Reflood 2	
A. ANALYSIS OF RECORD	1976°F	1964°F	DCL-99-096
B. PERMANENT 10 CFR 50.46 ECCS MODEL ASSESSMENTS ²	$\Delta PCT =$	$\Delta PCT =$	
1. Intercell Force Gap Numbering Error	33°F	67°F	DCL-98-101
2. Vessel Channel DX Error (1998)	0°F	-67°F	DCL-00-051
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	2009°F	1964°F	

ATTACHMENT C

CURRENT SMALL-BREAK ECCS MODEL CHANGES AND ERRORS**NOTRUMP - Mixture Level Tracking/Region Depletion Errors**

Several closely related errors have been discovered in how NOTRUMP deals with the stack mixture level transition across a node boundary in a stack of fluid nodes. Firstly, when the mixture level attempts to transition a node boundary in a stack of fluid nodes, it can occasionally have difficulty crossing the interface (i.e. level hang). When a mixture level hang occurs at a node boundary, this leads to situations where the flow for a given time step is reset and becomes inconsistent with the matrix solution of the momentum equation for an excessive period of time. This results in local mass/energy errors being generated. In addition, it was discovered that the code was not properly updating metal node temperatures as a result of the implementation of the nodal region depletion logic which can be incurred when a fluid node empties or fills. It is noted that several aspects of these errors, namely mixture level tracking and flow resets, are not directly tied to erroneous coding; rather, they are a direct result of modeling choices made and documented in the original code development/licensing. These errors affect all code versions up to and including NOTRUMP Version 37.0. These error corrections were determined to contain both Discretionary and Non-Discretionary Change aspects in accordance with Sections 4.1.1 and 4.1.2 of WCAP-13451.

Affected Evaluation Model

1985 Westinghouse Small Break LOCA Evaluation Model with NOTRUMP
1985 Westinghouse Small Break LOCA Evaluation Model with NOTRUMP (AP600 implementation)

Estimated Effect

The nature of this error leads to a bounding 13°F increase of the calculated PCT for all standard evaluation model applications. Plant specific PCT impacts will be assessed where required. The AP600 evaluation model application is not expected to incur a PCT impact since it does not uncover the core.