

October 18, 2016

PG&E Letter DCL-16-105

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

10 CFR 50.46

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 for Peak Cladding Temperature for 2015

Reference: 1. PG&E Letter DCL-15-093, "10 CFR 50.46 Annual Report of
Emergency Core Cooling System Evaluation Model Changes for
Peak Cladding Temperature for 2014," dated August 6, 2015.
(ADAMS Accession No. ML15218A626)

Dear Commissioners and Staff:

Pursuant to 10 CFR 50.46, the enclosure to this letter is the annual report of changes in the Westinghouse emergency core cooling system evaluation models that affect peak cladding temperature (PCT) calculations for Pacific Gas and Electric Company's (PG&E's) Diablo Canyon Power Plant, Units 1 and 2. The attachments to the enclosure provide a summary of the PCT margin allocations and their bases.

The PCT values remain within the 2200°F limit specified in 10 CFR 50.46. Because the Unit 1 and Unit 2 best-estimate, large-break loss-of-coolant accident analyses each have a total PCT margin allocation that is currently greater than 50°F, PG&E has already proposed to complete a reanalysis of both units using the Westinghouse FULL SPECTRUM™ LOCA (FSLOCA™) methodology and will provide the updated PCT results to the NRC by December 2018, per PG&E Letter DCL-15-093 (Reference 1). The FSLOCA™ will include code methodology changes that address fuel thermal conductivity degradation.

PG&E makes no new or revised regulatory commitments (as defined by NEI 99-04) in this letter.

If you have questions regarding this submittal please contact Mr. Mark Sharp at 805-545-3031.



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Sincerely,

A handwritten signature in blue ink that reads "Paula Gugen for JAMES WELSCH".

James M. Welsch
Vice President, Nuclear Generation

bnsn/4540

Enclosure

cc/enc: Kriss M. Kennedy, NRC Region IV Administrator
Christopher W. Newport, NRC Senior Resident Inspector
Balwant K. Singal, NRC Senior Project Manager
Diablo Distribution

**10 CFR 50.46 ANNUAL REPORT OF EMERGENCY CORE COOLING
SYSTEM EVALUATION MODEL CHANGES FOR PEAK CLADDING
TEMPERATURE FOR 2015**

Pursuant to 10 CFR 50.46, this enclosure provides an annual report of changes in the Westinghouse emergency core cooling system evaluation models that affect peak cladding temperature (PCT) calculations for Pacific Gas and Electric Company's (PG&E's) Diablo Canyon Power Plant, Units 1 and 2. This report is based on changes described in Westinghouse Letter LTR-LIS-16-29, "Diablo Canyon Units 1 and 2 10 CFR 50.46 Annual Notification and Reporting for 2015," dated February 18, 2016.

Attachment A contains 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 contains the corresponding Unit 2 data. There have been no changes in the SBLOCA PCT results or BELOCA PCT results for either Unit 1 or Unit 2 since the last annual update. The last annual update was provided in PG&E Letter DCL-15-093, "10 CFR 50.46 Annual Report of Emergency Core Cooling System Evaluation Model Changes for Peak Cladding Temperature for 2014," dated August 6, 2015.

The final net PCT values are listed below for each unit. Two PCT values are reported for the Unit 1 BELOCA results. The two BELOCA PCT values are labeled Reflood 1 and Reflood 2, as they represent the two distinctive PCT peaks that occur during the reflood phase for the Unit 1 BELOCA Code Qualification Document methodology. The Unit 2 BELOCA reports only one PCT value consistent with the BELOCA ASTRUM methodology.

SBLOCA

BELOCA

Reflood 1

Reflood 2

Unit 1: 1391°F (no change)	2049°F (no change)	2124°F (no change)
Unit 2: 1288°F (no change)	2125°F (no change)	

The PCT values remain within the 2200°F limit specified in 10 CFR 50.46. However, because the Unit 1 and Unit 2 BELOCA analyses each have a total PCT margin allocation that is currently greater than 50°F, PG&E has already proposed to complete a reanalysis of both Units using the Westinghouse FULL SPECTRUM™ LOCA (FSLOCA™) methodology and provide the updated PCT results to the NRC by December 2018, per PG&E Letter DCL-15-093. The FSLOCA™ will include code methodology changes that address fuel thermal conductivity degradation.

DCPP UNIT 1 PEAK CLADDING TEMPERATURE MARGIN UTILIZATION

SMALL-BREAK Loss-of-Coolant Accident

PG&E Letter¹

A.	ANALYSIS OF RECORD	Peak Cladding Temperature (PCT) =	1391°F	DCL-09-057
B.	PRIOR 10 CFR 50.46 EMERGENCY CORE COOLING SYSTEM (ECCS) MODEL ASSESSMENTS ²			
	1. None	Δ PCT =	0°F	
C.	10 CFR 50.46 ECCS MODEL ASSESSMENTS THIS YEAR			
	1. None	Δ PCT =	0°F	
D.	SUM OF 10 CFR 50.46 CHANGES			
	1. Net Sum of 10 CFR 50.46 PCT Changes	Δ PCT =	0°F	
	2. Absolute Sum of 10 CFR 50.46 PCT Changes	Δ PCT =	0°F	
E.	Analysis of Record PCT (Line A) + Line D.1 Net Sum of 10 CFR 50.46 PCT Changes		<hr/> 1391°F	

The sum of the PCT from the most recent analysis of record using an acceptable evaluation model and the estimates of the net PCT effect for changes and errors identified since this analysis remains less than 2200°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 1 PEAK CLADDING TEMPERATURE MARGIN UTILIZATION

Best Estimate, Large Break Loss-of-Coolant Accident

PG&E Letter¹

	Reflood 1	Reflood 2	
A. ANALYSIS OF RECORD	1900°F	1860°F	DCL-05-146
	<u>ΔPCT</u>	<u>ΔPCT</u>	
B. PRIOR 10 CFR 50.46 EMERGENCY CORE COOLING SYSTEM (ECCS) MODEL ASSESSMENTS ²			
1. Revised blowdown heatup uncertainty distribution.	5°F	5°F	DCL-05-086
2. HOTSPOT Fuel Relocation Error.	10°F	0°F	DCL-07-071
3. Replacement Steam Generators	75°F	71°F	DCL-09-057
4. 230 kV Degraded Voltage Event	0°F	39°F	DCL-11-082
5. Performance and Design (PAD) 4.0 Implementation	-118°F	-118°F	DCL-12-102
6. Fuel Thermal Conductivity Degradation (TCD) and Peaking Factor Burndown	133°F	238°F	DCL-12-102
7. Revised Heat Transfer Multiplier Distributions	5°F	-35°F	DCL-13-111
8. Changes to Grid Blockage and Porosity	24°F	24°F	DCL-13-111
9. Error in Burst Strain Application	15°F	40°F	DCL-14-070
C. 10 CFR 50.46 ECCS MODEL ASSESSMENTS THIS YEAR			
1. None			
D. SUM OF 10 CFR 50.46 CHANGES			
1. Net Sum of PCT Changes	149°F	264°F	
2. Absolute Sum of PCT Changes	385°F	570°F	
E. Analysis of Record PCT (Line A) + Line D.1 Net Sum of 10 CFR 50.46 PCT Changes	2049°F	2124°F	

The sum of the PCT from the most recent analysis of record using an acceptable evaluation model and the estimates of the net PCT effect for changes and errors identified since this analysis remains less than 2200°F.

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DCPP UNIT 2 PEAK CLADDING TEMPERATURE MARGIN UTILIZATION

Small Break Loss-of-Coolant Accident

PG&E Letter¹

A.	ANALYSIS OF RECORD	Peak Cladding Temperature (PCT) =	1288°F	DCL-08-061
B.	PRIOR 10 CFR 50.46 EMERGENCY CORE COOLING SYSTEM (ECCS) MODEL ASSESSMENTS ²			
	1. None	Δ PCT =	0°F	
C.	10 CFR 50.46 ECCS MODEL ASSESSMENTS THIS YEAR			
	1. None	Δ PCT =	0°F	
D.	SUM OF 10 CFR 50.46 CHANGES			
	1. Net Sum of 10 CFR 50.46 PCT Changes	Δ PCT =	0°F	
	2. Absolute Sum of 10 CFR 50.46 PCT Changes	Δ PCT =	0°F	
E.	Analysis of Record PCT (Line A) + Line D.1 Net Sum of 10 CFR 50.46 PCT Changes		<hr/> 1288°F	

The sum of the PCT from the most recent analysis of record using an acceptable evaluation model and the estimates of the net PCT effect for changes and errors identified since this analysis remains less than 2200°F.

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DCPP UNIT 2 PEAK CLADDING TEMPERATURE MARGIN UTILIZATION

BELOCA

PG&E Letter¹

A.	ANALYSIS OF RECORD	PCT=	1872°F	DCL-07-071
B.	PRIOR 10 CFR 50.46 ECCS MODEL ASSESSMENTS ²			
	1. HOTSPOT Fuel Relocation Error.	Δ PCT=	0°F	DCL-07-071
	2. 230 kV Degraded Voltage Event.	Δ PCT=	16°F	DCL-11-082
	3. Fuel Thermal Conductivity Degradation (TCD) and Peaking Factor Burndown	Δ PCT=	209°F	DCL-12-102
	4. Revised Heat Transfer Multiplier Distribution	Δ PCT=	-17°F	DCL-13-111
	5. Changes to Grid Blockage and Porosity	Δ PCT=	24°F	DCL-13-111
	6. Error in Burst Strain Application	Δ PCT=	21°F	DCL-14-070
C.	10 CFR 50.46 ECCS MODEL ASSESSMENTS THIS YEAR			
	1. None	Δ PCT=		
D.	SUM OF 10 CFR 50.46 CHANGES			
	1. Net Sum of 10 CFR 50.46 PCT Changes	Δ PCT=	253°F	
	2. Absolute Sum of 10 CFR 50.46 PCT Changes	Δ PCT=	287°F	
E.	Analysis of Record PCT (Line A) + Line D.1 Net Sum of 10 CFR 50.46 PCT Changes		2125°F	

The sum of the PCT from the most recent analysis of record using an acceptable evaluation model and the estimates of the net PCT effect for changes and errors identified since this analysis remains less than 2200°F.

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