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Director
Nuclear Regulatory Affairs

December 21, 2007

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D. C. 20555

Subject: **Docket Nos. 50-361 and 50-362, 2006 Emergency Core Cooling System Annual 10 CFR 50.46 Report, San Onofre Nuclear Generating Station, Units 2 and 3.**

References:

1. Letter from A. E. Scherer (SCE) to Document Control Desk (NRC), dated December 19, 2006, Subject: Docket Nos. 50-361 and 50-362, 2005 Emergency Core Cooling System Annual 10 CFR 50.46 Report, San Onofre Nuclear Generating Station, Units 2 and 3

2. 30-Day Report from A. E. Scherer (SCE) to Document Control Desk (NRC), Dated May 12, 2006, Docket Nos. 50-361 and 50-362, 10 CFR 50.46 30-Day Report for Changes to the Emergency Core Cooling System Performance Analysis, San Onofre Nuclear Generating Station, Units 2 and 3

This letter transmits as Enclosures 1 and 2 the San Onofre Units 2 and 3 annual report for the 2006 calendar year required by 10 CFR 50.46 (a)(3)(ii) of, "Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors." This regulation requires Southern California Edison (SCE) to annually report to the NRC for San Onofre Units 2 and 3 the nature of each change to or error discovered in the Emergency Core Cooling System (ECCS) evaluation model or in the application of this model that affects the temperature calculation and estimated effects of any such changes, errors, or applications on the limiting ECCS analysis. Any significant change or error is required to be reported to the NRC within 30 days.

The previous Emergency Core Cooling System Annual 10 CFR 50.46 Report was submitted to the NRC in Reference 1.

Enclosure 1 is a description of changes or errors in the Westinghouse evaluation models used in the San Onofre Nuclear Generating Station (SONGS) 2 and 3 ECCS performance analyses.

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Enclosure 2 is a summary of the effect on Peak Clad Temperature (PCT) of the errors or changes in the Westinghouse evaluation models used in the SONGS Units 2 and 3 ECCS performance Analyses. While not limiting with regard to PCT, detailed information for the Small Break Loss Of Coolant Accident (LOCA) is also included in Enclosure 2 (in accordance with Supplement 1 to Information Notice 97-15).

SCE made no changes to the LOCA evaluation models.

Operating Cycle Information

Unit 2 and Unit 3 operation for the current reporting period is outlined below.

Unit	Year	Cycle 13	Cycle 14
2	2006	January 1, 2006 through January 3, 2006	April 22, 2006 through December 31, 2006
3	2006	January 1, 2006 through October 16, 2006	December 12, 2006 through December 31, 2006

SONGS Units 2 and 3 Large Break LOCA Evaluation Model (EM) - 2006 Reporting Period

The Large Break LOCA analysis (LBLOCA) used the 1985 EM for cycle 13 operation and uses the 1999 EM for Cycle 14. The NRC was notified of the change in the evaluation model and new analysis of record through Reference 2.

The limiting Large Break LOCA PCT did not exceed the 10 CFR 50.46(b)(1) acceptance criterion of 2,200 °F. This is documented in Enclosure 2 (Table 1).

The cumulative (sum of the absolute magnitudes of PCT changes) 1985 EM Large Break LOCA 10 CFR 50.46 model changes and model errors remain less than 1 °F.

There are no cumulative (sum of the absolute magnitudes of PCT changes) 1999 EM Large Break LOCA 10 CFR 50.46 model changes and model errors.

This is documented in Enclosure 2 (Table 2).

SONGS Units 2 and 3 Small Break LOCA Evaluation Model (EM) - 2006 Reporting Period

The Small Break LOCA (SBLOCA) analysis uses the Supplement 2 Model (S2M) Small Break LOCA evaluation model for all of 2006. The Analysis of Record was changed through Reference 2.

The limiting Small Break LOCA PCT did not exceed the 10 CFR 50.46(b)(1) acceptance criterion of 2,200 °F, and remained bounded by the large break LOCA PCT. This is documented in Enclosure 2 (Table 3).

The cumulative (sum of the absolute magnitudes of PCT changes) Small Break LOCA 10 CFR 50.46 model changes and model errors, since the approval of the "S2M Evaluation Model," is 0 °F. This is documented in Enclosure 2 (Table 4).

If you have any questions or need additional information on this subject, please contact Ms. L. Conklin at 949/368-9443.

Sincerely,

cc: E. E. Collins, Regional Administrator, NRC Region IV
N. Kalyanam, NRC Project Manager, San Onofre Units 2 and 3
C. C. Osterholtz, NRC Senior Resident Inspector, San Onofre Units 2 and 3

Enclosure 1

Description of Changes or Errors in the Westinghouse Evaluation Models used in the SONGS Units 2 and 3 ECCS Performance Analyses

(Calendar Year 2006)

1. 1999 EM Version of the Westinghouse Appendix K Large Break LOCA Evaluation Model for Combustion Engineering (CE) PWRs

Rod-to-Rod Radiation Enclosure Selection Process Improvement for the 1999 EM
(Enhancements/Forward-Fit Discretionary Changes)

Background

The Appendix K ECCS Performance Analysis for LBLOCA for CE plants is performed with the 1999 Evaluation Model (1999 EM). The hot rod heat-up portion of this analysis contains a component model for rod-to-rod radiation, which utilizes an enclosure of fuel rods. In the Evaluation Model Topical Report, the rod-to-rod radiation methodology and a related SER limitation/constraint require that a bounding radiation enclosure will be used in the analysis. Search criteria are specified in the NRC-accepted Topical Report for ensuring that these conditions are met. The process for identifying candidate limiting enclosures for the rod-to-rod radiation model includes the use of an automated survey of the core on a pin-by-pin basis. The REX code is the utility code that executes the surveying process for identifying potentially limiting radiation enclosures for evaluation in the LBLOCA Performance Analysis.

In 2005, a problem developed with the REX code, in that inappropriate radiation enclosures for the rod-to-rod radiation model were being identified. This had the potential for adding considerable inefficiency to the reload analysis process, since all identified candidates must be dispositioned for the analysis. This problem coincided with the introduction of ZrB_2 IFBA bearing cores, which have flatter power distributions. It was found that some candidate enclosures contained target hot rods operating below the power of the average rod of the hot assembly. This result produced candidate enclosures that fall outside the range of applicability of the rod-to-rod radiation methodology and therefore are inappropriate for the analysis. The REX utility code was modified to eliminate inappropriate enclosures derived from the survey process. This modification has no impact on the final limiting enclosure used in determining PCT.

Affected Evaluation Model

Appendix K LBLOCA Evaluation Model, 1999 EM

Estimated Effect

This process improvement has no impact on the licensed methodology or on the NRC accepted search criteria and does not conflict with the SER limitation/constraint imposed on the radiation model. There is no impact on PCT for 10 CFR 50.46 reporting purposes.

2. 1985 EM Version of the Westinghouse Appendix K Large Break LOCA Evaluation Model for Combustion Engineering PWRs

None.

3. S2M Version of the Westinghouse Appendix K Small Break LOCA Evaluation Model for Combustion Engineering PWRs

None.

Enclosure 2

Summary of the Effect on PCT of the Errors or Changes in the Westinghouse Evaluation Models used in the SONGS Units 2 and 3 ECCS Performance Analyses

(Calendar Year 2006)

2006 REPORTING PERIOD

LOSS OF COOLANT ACCIDENT (LOCA) MARGIN SUMMARY
SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2 AND 3

Large Break LOCA

Table 1 provides a time line of the items which could affect the Large Break LOCA peak cladding temperature (PCT) for this reporting period. The table is divided into two time periods (end of 2005 to end of Cycle 13 and start of Cycle 14 to end of 2006) to reflect the change in the Analysis of Record that occurred with the start of Cycle 14 (Reference 2). The new Analysis of Record was performed for the implementation of ZIRLO™ cladding, which occurred for Cycle 14. The new Analysis of Record uses the 1999 EM version of the Westinghouse large break LOCA evaluation model for Combustion Engineering PWRs. The previous Analysis of Record used the 1985 EM. The 10 CFR 50.46 PCT limit of 2,200°F was not exceeded. It is a coincidence that the PCT at the end of Cycle 13 and at the beginning of Cycle 14 are the same.

Table 1

Limiting Large Break LOCA PCT

	Unit 2	Unit 3
Limiting Large Break LOCA PCT End of 2005	2,170 °F	2,136 °F
Changes in PCT during 2006 due to: a) Model changes or Model errors (1985 EM) • None	0 °F	0 °F
b) Cycle Dependent Input Changes • Cycle 13	0 °F	0 °F
End of Cycle 13	2,170 °F	2,136 °F
Start of Cycle 14 (Based on analysis using the 1999 EM)	2,170 °F	2,170 °F
Changes in PCT during 2006 due to: a) Model changes or Model errors (1999 EM) • Rod to Rod Radiation Enclosure Selection Process Improvement	0 °F	0 °F
b) Cycle Dependent Input Changes • Cycle 14	0 °F	0 °F
Limiting Large Break LOCA PCT End of 2006	2,170 °F	2,170 °F

The cumulative 10 CFR 50.46 model changes and model errors through the end of Cycle 13 for the 1985 EM and beginning with Cycle 14 for the 1999 EM are shown in Table 2.

Table 2

10 CFR 50.46
Model Changes and Model Errors
$\sum$ | Δ PCT| *

	Unit 2	Unit 3
Cumulative LBLOCA 10 CFR 50.46 Model Changes and Model Errors Prior to 2006	<1 °F	<1 °F
Changes in LBLOCA PCT due to Model Changes and Model Errors (1985 EM) Discovered in 2006 • None	0 °F	0 °F
Cumulative LBLOCA 10 CFR 50.46 Model Changes and Model Errors • End of Cycle 13	<1 °F	<1 °F
Start of Cycle 14	0 °F	0 °F
Changes in LBLOCA PCT due to Model Changes and Model Errors (1999 EM) Discovered in 2006 • Rod to Rod Radiation Enclosure Selection Process Improvement	0 °F	0 °F
End of 2006	0 °F	0 °F

* Sum of the absolute magnitude of the 10 CFR 50.46 model changes and model errors.

Small Break LOCA

Table 3 provides a time line of the items which could affect the Small Break LOCA (SBLOCA) peak cladding temperature (PCT) for this reporting period. The table is divided into two time periods (end of 2005 to end of Cycle 13 and start of Cycle 14 to end of 2006) to reflect the change in the Analysis of Record (AOR) that occurred with the start of Cycle 14 (Reference 2). The new Analysis of Record was performed for the implementation of ZIRLO™ cladding which occurred for Cycle 14. Both the previous Analysis of Record and the current Analysis of Record use the S2M version of the Westinghouse Appendix K Small Break LOCA Evaluation Model for Combustion Engineering PWRs. The SBLOCA 10 CFR 50.46 PCT limit of 2200 °F was not exceeded, and the SBLOCA PCT remained bounded by the LBLOCA PCT.

Table 3

Limiting Small Break LOCA PCT

	Unit 2	Unit 3
Limiting Small Break LOCA PCT End of 2005	1,903 °F	1,903 °F
Changes in PCT during 2006 due to: a) Model changes or Model errors • None b) Cycle Dependent Input Changes • Cycle 13	0 °F 0 °F	0 °F 0 °F
End of Cycle 13	1,903 °F	1,903 °F
Start of Cycle 14 (Based on the new AOR for ZIRLO™)	2,077 °F	2,077 °F
Changes in PCT during 2006 due to: a) Model changes or Model errors • None b) Cycle Dependent Input Changes • Cycle 14	0 °F 0 °F	0 °F 0 °F
Limiting Small Break LOCA PCT End of 2006	2,077 °F	2,077 °F

The cumulative 10 CFR 50.46 model changes and model errors through the end of Cycle 13 for the previous Analysis of Record and from the beginning of Cycle 14 for the current Analysis of Record are shown in Table 4.

Table 4

Cumulative Small Break LOCA 10 CFR 50.46
Model Changes and Model Errors
$\sum |\Delta PCT|$ *

	Unit 2	Unit 3
Cumulative SBLOCA 10 CFR 50.46 Model Changes and Model Errors Prior to 2006	19 °F	19 °F
Changes in SBLOCA PCT due to Model Changes and Model Errors Discovered in 2006 • None	0 °F	0 °F
Cumulative SBLOCA 10 CFR 50.46 Model Changes and Model Errors • End of Cycle 13	19 °F	19 °F
Start of Cycle 14	0 °F	0 °F
Changes in SBLOCA PCT due to Model Changes and Model Errors Discovered in 2006 • None	0 °F	0 °F
End of 2006	0 °F	0 °F

* Sum of the absolute magnitude of the 10 CFR 50.46 model changes and model errors.