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Richard J. St. Onge
Director, Nuclear Regulatory Affairs and
Emergency Planning

February 4, 2013 10 CFR 50.4

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

Subject: **Docket No. 50-361**
Response to Request for Additional Information (RAI 8)
Regarding Confirmatory Action Letter Response
(TAC No. ME 9727)
San Onofre Nuclear Generating Station, Unit 2

References:
1. Letter from Mr. Elmo E. Collins (USNRC) to Mr. Peter T. Dietrich (SCE), dated March 27, 2012, Confirmatory Action Letter 4-12-001, San Onofre Nuclear Generating Station, Units 2 and 3, Commitments to Address Steam Generator Tube Degradation

2. Letter from Mr. Peter T. Dietrich (SCE) to Mr. Elmo E. Collins (USNRC), dated October 3, 2012, Confirmatory Action Letter – Actions to Address Steam Generator Tube Degradation, San Onofre Nuclear Generating Station, Unit 2

3. Letter from Mr. James R. Hall (USNRC) to Mr. Peter T. Dietrich (SCE), dated December 26, 2012, Request for Additional Information Regarding Response to Confirmatory Action Letter, San Onofre Nuclear Generating Station, Unit 2

Dear Sir or Madam,

On March 27, 2012, the Nuclear Regulatory Commission (NRC) issued a Confirmatory Action Letter (CAL) (Reference 1) to Southern California Edison (SCE) describing actions that the NRC and SCE agreed would be completed to address issues identified in the steam generator tubes of San Onofre Nuclear Generating Station (SONGS) Units 2 and 3. In a letter to the NRC dated October 3, 2012 (Reference 2), SCE reported completion of the Unit 2 CAL actions and included a Return to Service Report (RTSR) that provided details of their completion.

By letter dated December 26, 2012 (Reference 3), the NRC issued Requests for Additional Information (RAIs) regarding the CAL response. Enclosure 1 of this letter provides the response to RAI 8.

P.O. Box 128
San Clemente, CA 92672

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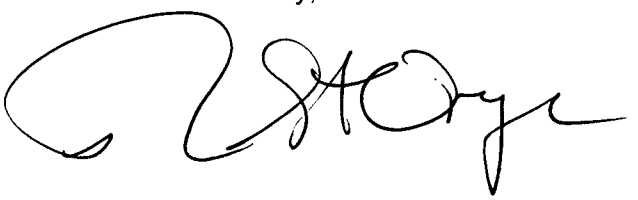
NRR

There are no new regulatory commitments contained in this letter. If you have any questions or require additional information, please call me at (949) 368-6240.

Sincerely,



Enclosure:

1) Response to RAI 8

cc: E. E. Collins, Regional Administrator, NRC Region IV
J. R. Hall, NRC Project Manager, SONGS Units 2 and 3
G. G. Warnick, NRC Senior Resident Inspector, SONGS Units 2 and 3
R. E. Lantz, Branch Chief, Division of Reactor Projects, NRC Region IV

ENCLOSURE 1

SOUTHERN CALIFORNIA EDISON

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

REGARDING RESPONSE TO CONFIRMATORY ACTION LETTER

DOCKET NO. 50-361

TAC NO. ME 9727

Response to RAI 8

RAI 8

It is stated in Reference 4, page 4-6, second paragraph that, "It has been observed that the number of AVB supports that develop wear in the second cycle of operation can increase dependent on the number of worn AVB indications at the beginning of the second cycle. These data were used in the OA to add AVB locations at the start of Cycle 17 from a statistical representation of this data." Provide a more complete description of the model used to add AVB locations that will develop wear during the second cycle. Confirm that this model applies to both the 560 tubes with existing tube support wear and the 1350 NDD tubes.

RESPONSE

Note: RAI Reference 4 is the "Operational Assessment for SONGS Unit 2 SG for Upper Bundle Tube-to-Tube Wear Degradation at End of Cycle 16," prepared by Intertek APTECH for Areva, Report No. AES 12068150-2Q-1, Revision 0, September 2012.

The inspection results from a similar replacement steam generator (RSG) unit were used to establish the probability of having new wear locations in a tube with prior anti-vibration bar (AVB) wear after completing the second (full) cycle of operation subsequent to generator replacement. The algorithm for SONGS Unit 2 conservatively assumes any new wear locations initiate at the start of the next cycle of operation, although in reality, new wear locations may develop at various times during the cycle.

New tube to AVB wear locations are assigned using a statistical model. The data for the model came from a similar RSG two-loop design of comparable size with more than two operating cycles. Because of the similar U-bend support structure, the data were considered applicable to SONGS. A difference between the two units is the number of AVB supports (eight versus 12 bars for SONGS steam generators). Most support of the U-bend for SONGS comes from the inner eight AVBs. Little to no tube to AVB wear is observed in the outer support locations prior to TTW. Since the two units are similar in the number of active supports, normalization between the two designs was not required for assigning new wear locations.

The data defining the increase in the number of tube to AVB contact locations are well represented by Poisson distribution functions. The parameters for the Poisson distribution were developed by standard regression analysis. The Poisson distribution was selected because it is a single parameter function and is a good representation for distributions of integer variables such as the number of AVBs.

Cumulative distribution functions (CDF) were developed from the fitted Poisson distributions. Each CDF is dependent on the number of wear locations that exist in a given tube at the end of the first cycle of operation. These CDFs were sampled at the start of the next cycle of operation for each trial in the Monte Carlo simulation and new locations were added to each tube accordingly. The CDFs representing new wear sites are based on 100% power for the similar RSG over the full 2nd cycle of operation. No credit was taken for operation at 70% power for the five month operating interval when assigning new wear sites, making this approach conservative.

This method was implemented for the 560 tubes with existing tube support wear. The group of 1350 tubes with no detected wear used a different method for assigning wear locations at the start of the next operating cycle as described in the response to RAIs 5 and 7.