Lent, Susan

From: Hall, Randy
Sent: Friday, November 30, 2012 3:50 PM
To: Ryan.Treadway@sce.com
Cc: joseph.bashore@sce.com; John.Brabec@sce.com; Broaddus, Doug; Jackson, Christopher; Kulesa, Gloria; Elliott, Robert; Pelton, David; Paige, Jason; Murphy, Emmett; Karwoski, Kenneth; Thurston, Carl; Hoxie, Chris; Williamson, Edward; Smith, Maxwell; Grover, Ravinder; Beaulieu, David; Parks, Benjamin; Clifford, Paul; Kanatas, Catherine
Subject: Draft Request for Additional Information on SCE's Response to NRC's Confirmatory Action Letter for San Onofre Nuclear Generating Station Unit 2 (ME9727)
Attachments: SONGS Draft RAI Nov 30.docx

November 30, 2012

Mr. Ryan Treadway
Manager, Nuclear Regulatory Affairs
San Onofre Nuclear Generating Station
Southern California Edison Company

Ryan:

By letter dated October 3, 2012, (Agencywide Documents Access and Management System (ADAMS) Accession No. ML122850320) Southern California Edison (SCE) submitted its response to the NRC Confirmatory Action Letter (CAL) dated March 27, 2012, for San Onofre Nuclear Generating Station (SONGS), Unit 2. The NRC staff has begun its detailed review of SCE's CAL response and Return to Service report for SONGS Unit 2 and has determined that additional information is needed in order to complete our evaluation. The NRC staff's initial draft request for additional information (RAI) regarding the CAL response is attached. The staff is currently developing additional questions and will transmit those to SCE as they become available.

The NRC staff would like to have a conference call with SCE later next week to clarify any questions your staff might have regarding this request for additional information. In addition, we would like to hold a public meeting with SCE here at NRC headquarters on December 18th to discuss the RAIs and SCE's plans and schedule for its response. I will be contacting you separately to discuss arrangements for the teleconference and the meeting.

Sincerely,

Randy Hall, Senior Project Manager
San Onofre Special Projects Branch
Division of Operating Reactor Licensing
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OFFICE OF NUCLEAR REACTOR REGULATION
REQUEST FOR ADDITIONAL INFORMATION
SOUTHERN CALIFORNIA EDISON
SAN ONOFRE NUCLEAR GENERATING STATION, UNIT 2
RESPONSE TO MARCH 27, 2012, NRC CONFIRMATORY ACTION LETTER
DOCKET NO. 50-361
TAC NO. ME9727

By letter dated October 3, 2012, (Agencywide Documents Access and Management System (ADAMS) Accession No. ML122850320, Reference 1) Southern California Edison (SCE) submitted its response to the NRC Confirmatory Action Letter (CAL) dated March 27, 2012, for San Onofre Nuclear Generating Station (SONGS), Unit 2. The NRC staff has begun its detailed review of SCE's CAL response for SONGS Unit 2 and has determined that additional information is needed in order to complete our evaluation. The NRC staff's initial draft request for additional information (RAI) regarding the CAL response is provided below.

1. The Operational Assessment (OA) in Attachment 6, Appendix A (Reference 2), reports the 3 times normal operating pressure differential as being 4290 psi for 100% power conditions. This is the same value assumed in the Condition Monitoring Assessment provided in Attachment 2. This value is significantly higher than the values ranging from 3972-3975 psi for 100% power reported in Attachment 6, Appendices B, C, and D (References 3-5). Describe the reason for the differences.

2. The Operational Assessment in Attachment 6, Appendix C (Reference 4), pages 3-2 and 4-12, appears to state that tube-to-tube wear (TTW) growth rates are based on the maximum TTW depths observed in Unit 3 at EOC 16 divided by the first Unit 3 operating period (0.926 years at power). Provide justification for the conservatism of this assumption. This justification should address the following:

    a. Reference 4, page 3-2 defines "wear index" for a degraded tube and states that the existence of TTW and distribution of TTW depths are strongly correlated to the wear index. This is pictured in Figures 4-4 in terms of TTW initiation. This figure shows that TTW is not expected to have initiated until a threshold value of wear index is reached. This threshold value varies from tube to tube according to a cumulative probability distribution shown in the figure. This figure illustrates that TTW is not expected to have initiated until sometime after BOC 16. This suggests that the observed TTW depth at EOC 16 developed over a smaller time interval than the 0.926 years assumed in the analysis.

    b. An independent analysis in Reference 3 also indicates an extremely low probability of instability onset at BOC 16 as illustrated in Figure 8-3. Reference

3, page 106 interprets this figure as indicating that the probability of instability only reaches 0.22 after 3 months and only becoming "high" after 4 months.

c. Reference 3 also considered a variety of different wear rate models to estimate how long it took to develop the observed TTW depths at Unit 3 after instability occurred. These analyses are documented in Appendix A of Reference 3 and produced estimates in the range of 2.5 to 11 months.

3. Regarding Reference 4, describe the sensitivity of the results in Figure 5-4 to the definition of "wear index." If alternate definitions significantly affect the results, what is the justification for the definition being used?

4. Regarding Reference 4, does the definition of "wear index" include summing the depths of 2-sided wear flaws at a given AVB intersection? If not, explain why SCE's approach is conservative.

5. Regarding Reference 4, third paragraph from the bottom of page 4-3, why is non-detected wear only assigned to no degradation detected (NDD) tubes and not to NDD tube/AVB intersections in tubes with detected wear at other intersections?

6. Regarding Reference 4, page 4-5, it seems that depths of undetected flaws are assumed to be associated with probability of detection (POD) ≤ 0.05. Why is this conservative? Is there a possibility that some undetected flaws may be associated with higher values of POD?

7. Regarding Reference 4, page 4-5, what is meant by the words, "each active wear location" in the 1350 NDD tubes? How are the "active wear" locations determined?

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 dependant 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.

9. It is stated in Reference 4, at the top of page 4-9 that the simulation results of the bench marking process are shown in Figure 4-6. Provide additional detail on what Figure 4-6 is showing and how it relates to the benchmarking process. As part of this additional detail, explain the meaning of the ordinate label "number of observations" in the figure.

10. Technical Specification (TS) 3.4.13.d allows 150 gallons per day primary to secondary leakage. The Return to Service Report (Enclosure 2 of Reference 1), Section 9.4.1

states, "The plant operating procedure for responding to a reactor coolant leak has been modified to require plant Operators to commence a reactor shutdown upon a valid indication of a primary-to-secondary SG tube leak at a level less than allowed by the plant's TSs. This procedure change requires earlier initiation of operator actions in response to a potential SG tube leak." Does this mean that a reactor shutdown would be commenced upon any valid indication of primary to secondary leakage? Provide a description of the action levels in the procedure. Discuss any additional actions, planned or taken, such as simulator testing, operator training, and/or any evaluations to assess potential impacts of the revised procedure.

11. Please submit an operational impact assessment for operation at 70% power. The assessment should focus on the cycle safety analysis and establish whether operation at 70% power is within the scope of SCE's safety analysis methodology, and that analyses and evaluations have been performed to conclude operation at 70% power for an extended period of time is safe. The evaluation should also demonstrate that the existing Technical Specifications, including limiting conditions for operation and surveillance requirements, are applicable for extended operation at 70% power.

12. Operation at a lower power level could introduce additional uncertainty in measuring reactor coolant flow. Please provide a detailed evaluation of RCS flow uncertainty, identify how RCS flow uncertainty is affected by operation at 70% power, and discuss the overall treatment of the RCS flow uncertainty, actual and indicated, in the context of the remaining safety analyses. Provide similar information for secondary flow uncertainty, as well.

13. The installation of new steam generators involved changes to the steam generator heat transfer characteristics, which could affect the performance of the plant under postulated loss of coolant accident conditions. Please explain how the existing ECCS analysis accounts for these changes, and how considerable steam generator tube plugging has been addressed in the ECCS evaluation. Provide the ECCS evaluation that will apply to the planned operating cycle.

14. Provide a summary disposition of the U2C17 calculations relative to the planned reduced-power operation.

REFERENCES

1. Letter from Peter T. Dietrich, SCE, to Elmo E. Collins, USNRC, "Docket No. 50-361, Confirmatory Action Letter – Actions to Address Steam Generator Tube Degradation, San Onofre Nuclear Generating Station, Unit 2," October 3, 2012. (ADAMS Accession No. ML122850320)

2. Enclosure 2 to Reference 1: San Onofre Nuclear Generating Station Unit 2 Return to Service Report, Attachment 6 – SONGS U2C17 Steam Generator Operational Assessment, Appendix A, Revision 2, "SONGS U2C17 Outage - Steam Generator Operational Assessment," prepared by Areva NP Inc. Document No. 51-9182833-002 (NP), Revision 2), October 2012.

3. Enclosure 2 to Reference 1: San Onofre Nuclear Generating Station Unit 2 Return to Service Report, Attachment 6 – SONGS U2C17 Steam Generator Operational Assessment, Appendix B, Revision 0, "SONGS U2C17 Steam Generator Operational Assessment for Tube-to-Tube Wear," prepared by Areva NP Inc. Document No. 51-9187230-000 (NP), Revision 0), October 2012.

4. Enclosure 2 to Reference 1: San Onofre Nuclear Generating Station Unit 2 Return to Service Report, Attachment 6 – SONGS U2C17 Steam Generator Operational Assessment, Appendix C, "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.

5. Enclosure 2 to Reference 1: San Onofre Nuclear Generating Station Unit 2 Return to Service Report, Attachment 6 – SONGS U2C17 Steam Generator Operational Assessment, Appendix D, "Operational Assessment of Wear Indications In the U-Bend Region of San Onofre Unit 2 Replacement Steam Generators," prepared by Westinghouse Electric Company LLC, Report No. SG-SGMP-12-10, Revision 3, October 2012.