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Director, Nuclear Regulatory Affairs and
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10 CFR 50.4

February 25, 2013

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 32)
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 2 of this letter provides the response to RAI 32, which relates to compliance with Technical Specification (TS) 5.5.2.11.

P.O. Box 128
San Clemente, CA 92672

Enclosure 1 provides a new commitment identified in this letter. If you have any questions or require additional information, please call me at (949) 368-6240.

Sincerely,

Enclosures:

1. Commitments
2. Response to RAI 32

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

Commitments

Enclosure 1
Commitments

This table identifies the action discussed in this letter that Southern California Edison (SCE) commits to perform. Any other actions discussed in this submittal are described for the NRC's information and are not commitments.

	Description of Commitments	Scheduled Completion Date
1	SCE will provide an OA that includes an evaluation of steam generator TTW for operation up to the RTP. This OA will be provided to the NRC for review by March 15, 2013. In this OA, SCE will supplement the Intertek OA (Enclosure 2, Attachment 6, Appendix C of the CAL Response Letter) which is based on 'traditional' industry guidelines. The OA supplement will demonstrate that the Structural Integrity Performance Criteria (SIPC) and the Accident Induced Leakage Performance Criteria (AILPC) are satisfied for 100% Rated Thermal Power (RTP).	March 15, 2013

ENCLOSURE 2

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 32

RAI 32

SONGS Unit 2 Technical Specification (TS) 3.4.17 requires that steam generator structural integrity be maintained in Modes 1, 2, 3, and 4 (Power Operation, Startup, Hot Standby, and Hot Shutdown, respectively). Limiting Condition for Operation (LCO) 3.4.17, "Steam Generator (SG) Tube Integrity," requires that steam generator tube integrity shall be maintained and all steam generator tubes satisfying the tube repair criteria shall be plugged in accordance with the Steam Generator Program in MODES 1, 2, 3, and 4. The steam generator tube rupture (SGTR) accident is the limiting design basis event for SG tubes and avoiding an SGTR is the basis for LCO 3.4.17. Surveillance Requirement (SR) 3.4.17.1 requires "Verify SG tube integrity in accordance with the Steam Generator Program."

The structural integrity performance criterion is described in SONGS Unit 2 TS 5.5.2.11.b.1 as follows:

> All in-service steam generator tubes shall retain structural integrity over the full range of normal operating conditions (including startup, operation in the power range, hot standby, cool down and all anticipated transients included in the design specification) and design basis accidents. This includes retaining a safety factor of 3.0 against burst under normal steady state full power operation primary-to-secondary pressure differential and a safety factor of 1.4 against burst applied to the design basis accident primary-to-secondary pressure differentials. Apart from the above requirements, additional loading conditions associated with the design basis accidents, or combination of accidents in accordance with the design and licensing basis, shall also be evaluated to determine if the associated loads contribute significantly to burst or collapse. In the assessment of tube integrity, those loads that do significantly affect burst or collapse shall be determined and assessed in combination with the loads due to pressure with a safety factor of 1.2 on the combined primary loads and 1.0 on axial secondary loads. [emphasis added]

As described in the SONGS Unit 2 license, SCE "is authorized to operate the facility at reactor core power levels not in excess of full power (3438 megawatts thermal)," which is also defined as Rated Thermal Power (RTP).

In SCE's operational assessment (OA) that evaluated tube degradation caused by mechanisms other than tube-to-tube wear (Reference 3), on Page 30 of 32, SCE concluded that "there is reasonable assurance that the performance criteria for the non-[tube-to-tube wear] TTW degradation will be met if Unit 2 were to operate for a full fuel cycle of 1.577 EFPY [effective full power years] at 100% reactor power." Thus it appears that in RAI Reference 3, SCE considered the requirements of TS 5.5.2.11.b.1 by addressing the licensed full power condition.

In contrast, SCE performed three other operational assessments that evaluated tube degradation due to tube-to-tube wear (References 4-6), but it appears that in these OAs, SCE addressed structural integrity requirements for TTW only at 70% reactor power, instead of at 100% reactor power. For example, in Reference 4, Section 10.0, "Conclusions," page 117 of 129, SCE states: "A 70% operating power level returns the Unit 2 steam generators to within the operational envelope of demonstrated successful operation…Operation at 70% power assures in-plane stability (SR<1) without dependence on any effective in-plane supports for U-bends."

Therefore, it appears that SCE has not provided an operational assessment that addresses compliance with TS 5.5.2.11.b for tube-to-tube wear, without reliance on compensatory measures (e.g., limiting reactor power to 70% RTP).

Please clarify how the information submitted by SCE demonstrates that the structural integrity performance criterion in TS 5.5.2.11.b.1 is met for operation within current licensed limits up to the licensed RTP, or provide an operational assessment that includes an evaluation of steam generator TTW for operation up to the RTP.

RESPONSE

This RAI response is to clarify the information previously submitted in the October 3, 2012 Confirmatory Action Letter (CAL) response and to explain compliance with Technical Specification (TS) 5.5.2.11.b.1 over the full range of normal operating conditions up to and including "normal steady-state full power operation." The RAI uses the term Rated Thermal Power (RTP) in referring to compliance with TS 5.5.2.11; however, this TS provision does not use that term. As detailed below, SCE's position is that compliance with TS 5.5.2.11 requires demonstration that the structural integrity performance criterion must be met up to and including the normal operating conditions in the current licensing basis, which in this case is distinct from Rated Thermal Power.

In addition, as requested by the RAI, SCE will provide an Operational Assessment of TTW for operation up to the RTP (100% power).

In this response, SCE is also providing a description of the actions it intends to take following return to service of Unit 2 for Cycle 17 relevant to the issues in this RAI.

Compliance with Technical Specification Requirements

Limiting Condition for Operation (LCO) 3.4.17 requires that steam generator (SG) tube integrity be maintained. The bases for TS 3.4.17 state that:

> SG tube integrity means that the tubes are capable of performing their intended RCPB safety function consistent with the licensing basis, including applicable regulatory requirements.

The Bases for TS 3.4.17 also state that the SCE SG Program is the means by which SG tube integrity is maintained and that the SG Program is based on NEI 97-06, "Steam Generator Program Guidelines." TS 5.5.2.11 specifies that the SG program is established and implemented to ensure that SG tube integrity is maintained. In addition the SG Program includes provisions for condition monitoring, performance criteria for tube integrity, tube repair, tube inspections, and monitoring operational primary to secondary leakage.

The provisions for SG tube integrity are contained in TS 5.5.2.11.b.1. The definition of tube integrity includes structural integrity, which must be maintained over the full range of normal operating conditions. A safety factor of 3.0 must be maintained against burst under normal steady state full power operation primary to secondary pressure differential and a safety factor of 1.4 against burst applied to design basis accident primary to secondary pressure differentials. Accident induced leakage and operational leakage are also assessed as part of TS 5.5.2.11.b.1.

TS 5.5.2.11 does not refer to Rated Thermal Power as the upper bound on the "full range of normal operating conditions." It refers only to "normal steady state full power operation." The absence of the term Rated Thermal Power in TS 5.5.2.11 is significant, given that there are a number of other provisions in the TSs that use the term Rated Thermal Power, including TS Table 1.1-1, Surveillance Requirement 3.1.4.2, Figure 3.4.16-1, and Section 5.7.1.5.c. Instead, TS 5.5.2.11 refers to "normal steady state full power operation."

The clear purpose of TS 5.5.2.11 is to ensure that the SG tubes will retain their integrity over the range of operating conditions to which they will be subjected. In this case, that range is limited to 70% power. Therefore, SCE's OAs, which demonstrate that tube integrity will be maintained up to that level, meet the literal words and purpose of this TS provision.

In addition, "normal steady state full power operation" is the maximum power level in accordance with the current licensing basis, which based on the commitment made in response to the CAL is 70% power for the proposed operating period.

The 70% power commitment is an administrative restriction proposed by SCE based on the operating assessments for the operating period. Once made, this commitment becomes part of the SCE Unit 2 Current Licensing Basis. The NRC defines Current Licensing Basis (CLB) in 10CFR 54.3 as follows:

> Current licensing basis (CLB) is the set of NRC requirements applicable to a specific plant and a licensee's written commitments for ensuring compliance with and operation within applicable NRC requirements and the plant-specific design basis (including all modifications and additions to such commitments over the life of the license) that are docketed and in effect.

As a result of SCE's formal commitment established in the CAL response and Unit 2 Return to Service Report, the "normal steady state full power" in the Current Licensing Basis for Unit 2 is 70% power for the proposed operating period. Since all of the Operational Assessments (OAs) were performed for operation at or above 70% power, TS 5.5.2.11 compliance is demonstrated.

Operational Assessment at 100% Rated Thermal Power (RTP)

Operational Assessments (OAs) are performed in accordance with the SCE SG Program to ensure SG tube integrity and leakage integrity will be maintained during the operating period prior to the next planned SG inspection.

SCE provided a number of OAs for restart of Unit 2. The OA that addresses tube wear mechanisms other than tube-to-tube wear (TTW) was performed at 100% power. Three additional OAs were performed independently using diverse methods to address TTW. The three OAs addressing TTW were performed using the thermal-hydraulic conditions at 70% power.

As requested in the RAI, SCE will provide an OA that includes an evaluation of steam generator TTW for operation up to the RTP. This OA will be provided to the NRC for review by March 15, 2013. In this OA, SCE will supplement the Intertek OA (Enclosure 2, Attachment 6, Appendix C of the CAL Response Letter) which is based on 'traditional' industry guidelines. The OA supplement will demonstrate that the Structural Integrity Performance Criteria (SIPC) and the Accident Induced Leakage Performance Criteria (AILPC) are satisfied for 100% Rated Thermal Power (RTP). [New Commitment]

The remaining TTW OAs will continue to be used in our decision to restrict operation to 70% power. These OAs demonstrate that sufficient margin to the onset of fluid elastic instability exists at 70% power.

Actions to be taken following return to service for Unit 2

SCE's CAL response provided several interim actions regarding operation for the initial 150 day period following startup from the current outage. Following that initial 150 day period, SCE intends to take the following actions on an interim basis until a long-term power level for Unit 2 is established:

1. Operation will be limited to 70% power unless approval for a higher power level is obtained from the NRC. If SCE repairs the existing steam generators for Unit 2, or if additional tube inspections or analyses provide new information demonstrating that Unit 2 is not susceptible to TTW by in-plane FEI at a higher power level, SCE may provide the NRC with justification(s) for operating at higher power levels up to 100% power. SCE will not operate Unit 2 at power levels higher than 70% until the NRC has authorized operation at higher power levels.

2. Following restart from the current outage, operation of SONGS Unit 2 will be restricted to 150 cumulative days of operation at or above 15% of RTP of 3438 MWt. After 150 days of cumulative operation at or above 15% power, SCE will shut down Unit 2 for a mid-cycle steam generator tube inspection outage and will perform tube inspections in accordance with Technical Specification 5.5.2.11 and Section 8.3 of the Unit 2 Return to Service (RTS) Report. Steam generator tube inspections performed during subsequent inspection outages will be performed using the same inspection scope and methods.

3. Using the results of the tube inspection during the first mid-cycle outage during Cycle 17, SCE will prepare an updated OA for Unit 2. The OA will be performed for operation at 70% of RTP and will determine the duration of the subsequent operating period until the next inspection outage. Following any subsequent outage with steam generator tube inspections, SCE will update this OA as needed to support operation at the intended power level.

4. At each inspection, SG tube wear indications will be evaluated in accordance with the Condition Monitoring requirements of the SONGS Technical Specifications and industry guidelines for structural and leakage integrity. Confirmed new TTW indications (non-legacy) or confirmed increases in size of existing (previously identified) TTW indications will be assessed to determine if they are the result of in-plane FEI. SCE will restart Unit 2 when the inspection program demonstrates reasonable assurance that TTW caused by in-plane FEI did not occur and condition monitoring demonstrates tube integrity performance criteria are satisfied. SCE will operate up to the same power level allowed for the previous operating period and for the interval specified in the updated OA. This update to the OA will be prepared within 90 days after Mode 4 entry as required by industry guidelines. If in-plane FEI is observed, SCE will not restart Unit 2 without specific discussions with the NRC.

SCE intends to use the above approach until it determines the long-term operational limits for the Unit 2 SG's. SCE will inform the NRC when the determination is made of whether Unit 2 can be returned to 100% power operation or long-term operation at reduced power is needed.