SOUTHERN CALIFORNIA
EDISON®
An EDISON INTERNATIONAL® Company

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

January 18, 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 12)
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 12.

P.O. Box 128
San Clemente, CA 92672

IE36
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,

Enclosures:

1. Response to RAI 12

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 12

RAI 12

Operation at 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.

RESPONSE

Note: This response also includes information requested in RAI 14 associated with the Reactor Coolant System (RCS) Flow Uncertainty Analysis. RAI 14 states: "Provide a summary disposition of the U2C17 calculations relative to the planned reduction in power operation."

A detailed RCS flow uncertainty analysis for extended operation at 70% Rated Thermal Power (RTP) has been performed. The results were used to bound extended operation at greater than or equal to indicated 68% RTP. The methodology used is consistent with the methodology described in the SONGS Units 2 and 3 Reload Topical Report.

The RCS flow uncertainty analysis determined RCS flow uncertainties used in both the verification of minimum RCS flow (i.e. safety analysis input) and as the input to the overall uncertainty analysis required by the digital setpoint process for the Core Protection Calculators (CPCs) and the Core Operating Limit Supervisory System (COLSS). The RCS flow uncertainty analysis simulates the RCS flow calculation based upon the calorimetric method. This method is the Technical Specification (TS) 3.3.1.5 required method to calibrate the RCS flow used in the CPC and COLSS computer systems. The flow rate uncertainties are determined by the "stochastic simulation" technique. Important input parameters to the RCS flow uncertainty based upon calorimetric methods are secondary calorimetric power, hot leg temperature, cold leg temperature, and input uncertainties including secondary calorimetric power uncertainty, hot leg temperature uncertainty, and cold leg temperature uncertainty. The analysis was performed at three different power levels (68%, 95%, and 100%) to bound extended operation at greater than or equal to indicated 68% RTP.

The calorimetric based RCS flow uncertainty increases as a result of extended operation at reduced power resulting in an increase in the CPC/COLSS RCS flow uncertainties. For example, the COLSS RCS flow uncertainty increases from 4.4% when calibrated to calorimetric based RCS flow at 95% RTP to 5.7% when calibrated to calorimetric based RCS flow at 68% RTP. Key contributors to the RCS flow uncertainty increase are an increase in primary coolant enthalpy change uncertainty and the secondary calorimetric power uncertainty. The secondary calorimetric power uncertainty input to the RCS flow uncertainty analysis increased from ± 2.0% RTP at 95% RTP to ± 2.3% RTP at 68% RTP.

The primary coolant enthalpy change and secondary calorimetric power uncertainties increase as power lowers because they are dominated by parameters that decrease as power decreases, but the uncertainty on those parameters is constant. The ± 3 °F RCS hot leg (T_{HOT}) and cold leg (T_{COLD}) temperature uncertainty has more effect as the difference between T_{HOT} and T_{COLD} approaches zero. Similarly, as feedwater flowrate decreases, the ± 5.6 inches H_2O uncertainty of the feedwater flowrate transmitter has more impact on secondary calorimetric power indication. The increase in RCS flow uncertainty has been accounted for in the overall uncertainty analysis required by the digital setpoint process for CPC/COLSS and did result in a small increase on a power related penalty term used within the CPC/COLSS Departure from Nucleate Boiling Ratio (DNBR) algorithms.

With respect to the safety analyses, the minimum RCS flow rate used is 376,200 gpm which is 95% of 396,000 gpm specified by TS 3.4.1 and the Core Operating Limit Report (COLR). During performance of SR 3.4.1.3, indicated RCS flow minus uncertainties will be required to be greater than or equal to the minimum required by the safety analyses (e.g., actual flow must be greater than or equal to 376,200 gpm); therefore, no COLR change is required. Satisfying the above requirement ensures the safety analyses remain bounded with respect to RCS flow requirements during extended operation at greater than or equal to indicated 68% RTP.

The primary indicator for monitoring power at 70% RTP is the secondary calorimetric power calculation in COLSS since it has the minimum uncertainty of available power indications. The analysis for the secondary calorimetric power indication uncertainty was performed over a range of power levels from 20% RTP to 100% RTP. As indicated above, an uncertainty of ± 2.3% RTP at 68% power was used as input to the RCS flow uncertainty analysis. Another product of the secondary calorimetric power uncertainty analysis is a power level dependent bounding uncertainty curve (e.g., applicable uncertainties from 20% RTP to 100% RTP), which is used by COLSS to conservatively monitor Linear Heat Rate (LHR) and DNBR power operating limits and is used within transient safety analyses. At 70% RTP, the secondary calorimetric power indication is based on the feedwater flow venturi. As is done at full power, the uncertainty in the indication is accounted for in the overall uncertainty analysis and the LHR and DNBR power operating limits. Therefore, the increase in secondary calorimetric power and RCS flow uncertainties as steady state power is decreased is accounted for in the overall uncertainty analysis required by the digital setpoint process for CPC/COLSS and remaining safety analyses.