December 18, 2006

Mr. Richard M. Rosenblum
Senior Vice President and Chief Nuclear Officer
Southern California Edison Company
San Onofre Nuclear Generating Station
P.O. Box 128
San Clemente, CA 92674-0128

SUBJECT: SAN ONOFRE NUCLEAR GENERATING STATION, UNIT 3 - SUMMARY OF NOVEMBER 17, 2006, DISCUSSIONS OF STEAM GENERATOR TUBE INSPECTIONS (TAC NO. MD3204)

Dear Mr. Rosenblum:

On November 17, 2006, the Nuclear Regulatory Commission (NRC) staff participated in conference calls with Southern California Edison (SCE) representatives regarding the 2006 steam generator tube inspections at San Onofre Nuclear Generating Station, Unit 3. The information supplied by SCE in support of these discussions (handouts) is enclosed. The NRC staff did not identify any issues that would warrant preventing the plant from starting up following its 14th refueling outage.

Sincerely,

/RA/

N. Kalyanam, Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-362

Enclosures: 1. Summary of conference call
2. Information supplied by SCE in support of these discussions (handouts)

cc w/encls: See next page

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SUMMARY OF NOVEMBER 17, 2006, CONFERENCE CALL WITH

SAN ONOFRE NUCLEAR GENERATING STATION, UNIT 3

REGARDING THE 2006 STEAM GENERATOR TUBE INSPECTION RESULTS

On November 17, 2006, the Nuclear Regulatory Commission (NRC) staff conducted a phone call with representatives from San Onofre Nuclear Generating Station, Unit 3 (SONGS 3) to discuss the ongoing steam generator (SG) tube inspections during their Cycle 14 refueling outage (3C14). SONGS 3 has two Combustion Engineering Model 3410 SGs, designated SG 88 and SG 89, each with 9,350 tubes made from mill-annealed Alloy 600. The tubes have an outside diameter of 0.75 inch and a nominal wall thickness of 0.048 inch. The tubes are explosively expanded for the full depth of the tubesheet and are supported by carbon steel lattice grids (eggcrates). The tubes are also supported by carbon steel vertical and diagonal bars in the U-bend section. The hot-leg temperature has been approximately 598 to 600 degrees Fahrenheit for the last five operating cycles. The SONGS 3 SGs are scheduled to be replaced after two more operating cycles (i.e., one more inspection is planned for these SGs after the 2006 inspection).

The last inspection of the SG tubes at SONGS 3 was performed during the Cycle 13 refueling outage completed in October 2004. The number of tubes remaining in service at the start of the 3C14 outage was 8,646 in SG 88 and 8,699 in SG 89. Prior to the conference call, the licensee provided a written response to a set of questions from the NRC staff. The response is attached to this call summary. Additional clarifying information and information not included in the attached document is summarized below.

Throughout the operating cycle prior to the outage, the amount of primary-to-secondary leakage was below the 0.1 gallons per day (gpd) threshold detection level of the normal monitoring system. However, leakage at a rate of approximately 2×10^{-5} gpd was detected beginning on June 2, 2006, in weekly charcoal filter samples collected continuously from the condenser off-gas. The source of the leakage could not be determined, but the licensee suspects it is leakage past a plug. Monitoring will continue following the plant restart.

In discussing the scope of the inspections, the licensee clarified that the rotating probe inspections conducted in the upper region of the tubesheet extended from 4 inches above the top of the tubesheet (TTS) to 13 inches below the TTS on the hot-leg side, and from 2 inches above the TTS to 13 inches below the TTS on the cold-leg side. All of the tubes in service are fully expanded. The licensee also explained that dents are defined as tube diameter distortions located at a support plate, while dings are defined as tube diameter distortions located in a freespan.

At the time of the call, there were approximately 28 tubes in SG 88 and 10 tubes in SG 89 identified for plugging due to either wear indications at tube supports or cracking indications at or near the top of the hot-leg portion of the tubesheet. These included 7 tubes with indications of cracking and 31 tubes with indications of wear. Two of the cracking indications in each SG were circumferential and located near the TTS. The other 3 indications of cracking (in SG 88) were oriented axially. None of the indications of cracking were located within volumetric flaws. No indications were being left in service as a result of the C-star amendment, which permits

flaws of any size to remain in service if located at least 10.4 inches below the TTS in the hot-leg region and 11.0 inches below the TTS in the cold-leg region. The licensee was preparing to install plugs in all of the tubes with cracking indications, as well as stabilizers in the tubes in which these indications were circumferential.

Since the number of cracking indications was low, the staff asked the licensee to discuss whether eddy current noise or other factors may have caused a reduction in flaw detection. The licensee explained that their inspections continue to detect indications of cracking at the TTS that have very small eddy current signals, as well as wear scars with signals comparable to the small TTS cracking indications. In general, they have seen no changes in the appearance of the eddy current signals (including noise levels) that would indicate a loss of detection capability.

With respect to the wear indications, in each case the depth of the wear scar (i.e., wall-thickness reduction) was less than the plant's technical specification repair limit of 44 percent. However, for the approximately 31 tubes identified for plugging due to wear, the depth of the wear scars exceeded an administrative plugging limit. No wear indications were found at locations that do not correspond to the support structure (and might therefore indicate the failure of a support member). In addition, there were no indications that a support was not at its proper location.

A visual exam was performed on the secondary side using remote video camera equipment. The inspection concentrated on the periphery and the open tube lane. This inspection detected one unidentified loose part in SG 89 at the periphery of the cold-leg TTS region. The part was approximately 0.375 inch by 0.375 inch by 0.06 inch, apparently made of plastic, and was removed from the SG. The eddy current data indicated no damage from the part.

There was no sludge lancing performed during this outage. The licensee reported that at the time of the conference call, no new degradation mechanisms had been found, no tube pulls or in-situ pressure tests were planned, and no sleeves were being installed. At the end of the call, the licensee was asked to inform the staff if during the remainder of the inspections there were any unexpected results such as new degradation mechanisms.