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January 18, 1995

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U.S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington, D.C. 20555

Gentlemen:

Subject: **Docket Nos. 50-361 and 50-362**  
**Additional Information for**  
**Amendment Application Nos. 136 and 120**  
**"Degraded Grid Voltage"**  
**San Onofre Nuclear Generating Station**  
**Units 2 and 3**

Reference: September 29, 1993 letter from R. M. Rosenblum (SCE) to Document Control Desk (NRC). Subject: Amendment Applications 136 and 120, Proposed Change to Technical Specification 3/4.3.2, "Degraded Grid Voltage."

This letter provides additional information that the NRC has requested in support of the review of Amendment Applications 136 and 120 for San Onofre Units 2 and 3, respectively, which were submitted by the above reference. These amendment application requests consist of Proposed Change Number (PCN) 429, "Degraded Voltage." The NRC has requested 1) information regarding verification of modeling software for electrical calculations, 2) copies of voltage and time delay calculations in support of PCN 429, and 3) a copy of the Southern California Edison (Edison) Grid Voltage Reliability and Stability Study. This information is provided below and as Enclosures 1 and 2.

Software Modeling Verification

In accordance with Branch Technical Position PSB-1 Section 4, analytical techniques and assumptions used in voltage analyses were verified against actual measurements.

The results of the PSS/E computer program for dynamic simulation and the Bechtel Electrical Computer Analysis Package (BECAP) for steady state voltage simulation were compared to the pre-operational transformer tap verification test data gathered in 1981. In both cases, a minimum switchyard voltage of 218.5 kV (same as in the test) was used. Resulting analytical voltages at the 4 kV and 480 V emergency buses were compared to those measured during the pre-operational tests. Both programs resulted in voltages at the 4 kV and 480 V emergency buses that were conservative when compared to the actual measured voltages. The analytical voltage dips were more severe than measured plant performance. The comparison of analytical results to the plant performance shows that the PSB-1 acceptance criteria have been met.

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### Electrical Calculations

Copies of four electrical calculations which determined the setpoints for the proposed degraded voltage protection system are provided in Enclosure 1.

Since the submittal of PCN 429, one of these calculations, E4C-098, has been updated. The allowable range for the response time of relay 162T is now 0.85 seconds to 1.65 seconds (1.25 seconds  $\pm$  0.4 seconds). Previously this allowable response time had been reported as 1.5 seconds  $\pm$  0.15 seconds. Because the longest allowable response time for this relay (1.65 seconds) has not changed, this change has no effect on the overall proposed response time for the Degraded Grid Voltage with SIAS Signal (DGVSS) of 6.14 seconds.

Similarly, also in calculation E4C-098 for the Sustained Degraded Voltage Signal (SDVS), the response time for relay 162D has been revised from 120 seconds  $\pm$  12 seconds to 110 seconds  $\pm$  22 seconds. Again, because the longest allowable response time for this relay (132 seconds) has not changed, there is no effect on the overall proposed response time of 134.2 seconds for SDVS.

### Grid Reliability and Stability Study

The Reliability and Stability Study dated August 9, 1993 and provided as Enclosure 2 identifies six scenarios in which a voltage of less than 218 kV could be encountered in the San Onofre switchyard. Units 2 and 3 were protected against these six scenarios by Emergency Operating Procedures. These procedures require realignment of the offsite A. C. power sources and entry into Technical Specification 3.8.1.1.

Based on a letter which supplemented the grid stability study (dated November 2, 1993 and also included as part of Enclosure 2), the assumptions of the study were updated. This resulted in one case (outage of the Mira Loma 500 kV line) to no longer be expected to cause a degraded voltage at the switchyard. Current Edison procedures reflect this change to protect against the five possible scenarios.

If you have any questions regarding this matter, please let me know.

Sincerely,

cc: L. J. Callan, Regional Administrator, NRC Region IV  
A. B. Beach, Director, Division of Reactor Projects, NRC Region IV  
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