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March 28, 1995

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Gentlemen:

Subject: Docket Nos. 50-361 and 50-362
Fastener Strength Analysis
San Onofre Nuclear Generating Station
Units 2 and 3

Reference: Safety Evaluation from M. B. Fields (NRC) to Mr. Harold B. Ray (Edison) dated January 10, 1995.

In the referenced Safety Evaluation, the NRC noted that Edison's Fastener White Paper, Revision 1, considered the worst-case externally threaded fastener and worst case internally threaded fastener independently. The combined effect was not evaluated due to the two worst case items being of different nominal diameters.

The Safety Evaluation stated Edison would revise the Fastener White Paper to include combinations of a hypothetical worst-case external and internal thread dimensions derived from measurements of fasteners found at SONGS, and that the revised White Paper would be submitted to the NRC.

Edison has completed Revision 2 to the Fastener White Paper (Attached). The revision includes an evaluation of a "Combined-Case" which calculates the effect on the thread strength of a threaded joint for conditions where both the internal and external threaded fasteners would exhibit the maximum proportionally equivalent out-of-tolerance conditions observed from the sample data. The combined case evaluation shows overall fastener ultimate joint strength to be unaffected by this combined worst-case condition, notwithstanding a minor reduction in thread strength by a total of 10.45%. The evaluation revealed the limiting factor for joint strength to be the load across the external fastener (bolt) tensile root area.

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Thread strength was verified to be 2.40 times (240% of) the maximum ASME Section III Class 1 allowable preloads for this combined-case fastener, and 3.37 times (337% of) the Class 2 and 3 maximum allowable preloads.

In summary, the revised White Paper does not alter the conclusion that adequate margin exists in Section III design (200-300%) to accommodate minor fastener dimensional anomalies with no impact to operability of systems or components. Accordingly, there are no changes to the portion of the White Paper that was previously released as Revision 1.

We have also added to the White Paper the TETRA Engineering Statistical Evaluation report of the NRC's inspection sample of fasteners, obtained in a classically random manner. It is concluded in this report that the NRC data is bounded by the original White Paper data. Also included in the White Paper is the recent ASME Inquiry which clarifies the ASME position with respect to fastener inspection requirements.

If you have any further questions on this matter please let us know.

Sincerely,

Walter C. Marsh

Enclosure

cc: L. J. Callan, Regional Administrator, NRC Region IV
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