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

Gentlemen:

Subject: Docket No. 50-361 and 50-362
Response to NRC Request for Additional Information
on Pressure-Temperature Limits License Amendment Request
San Onofre Nuclear Generating Station
Units 2 and 3

References: 1. July 6, 1994, letter from Richard M. Rosenblum (Edison) to Document Control Desk (NRC), Subject: Docket No. 50-361, Supplement 1 to Amendment Application No. 118, Reactor Coolant System Pressure/Temperature Limits, Changes to Technical Specifications 3/4.4.8.1, 3.4.8.3.1, and 3.4.8.3.2, San Onofre Nuclear Generating Station, Unit 2

2. July 6, 1994, letter from Richard M. Rosenblum (Edison) to Document Control Desk (NRC), Subject: Docket No. 50-362, Supplement 2 to Amendment Application No. 102, Reactor Coolant System Pressure/Temperature Limits, Changes to Technical Specifications 3/4.4.8.1, 3.4.8.3.1, and 3.4.8.3.2, San Onofre Nuclear Generating Station, Unit 3

The purpose of this letter is to provide additional information requested by the NRC in support of the pressure-temperature limits in References 1 and 2.

NRC Question 1

"How did the licensee calculate a boltup temperature of 86°F? The boltup temperature needs to satisfy 10 CFR 50, Appendix G, paragraph IV.A.2. The rule requires that the reference temperature of the closure head flange plus 90°F. What is the reference temperature of the closure head flange?"

Edison Response

10 CFR 50, Appendix G, paragraph IV.A.2, states "When the core is not critical, pressure-temperature limits for the reactor vessel must be at least as conservative as those obtained by following the methods of analysis and the required margins of safety of Appendix G of the ASME

A001

Code supplemented by the requirements of Section V of this appendix. In addition, when pressure exceeds 20 percent of the preservice system hydrostatic test pressure, the temperature of the closure flange regions that are highly stressed by the bolt preload must exceed the reference temperature of the material in those regions by at least 120°F (67°C) for normal operation and by 90°F (50°C) for hydrostatic pressure tests and leak tests, unless a lower temperature can be justified by showing that the margins of safety for those regions when they are controlling are equivalent to those required for the beltline when it is controlling. The justification submitted for the pressure temperature limits must describe the methods of analysis used."

One of the San Onofre Units 2 and 3 criteria for pressure-temperature (P-T) limits is not to exceed the 20 percent pre-operational system hydrostatic test pressure at low operating temperatures. As such, ASME Section XI, Appendix G, paragraph G-2222 as described below was used for determining minimum boltup temperature in accordance with 10 CFR 50, Appendix G, paragraph IV.A.2.

ASME Section XI, Appendix G, paragraph G-2222, recommends that when the flange and adjacent shell region are stressed by the full intended bolt preload and by pressure not exceeding 20 percent of the pre-operational system hydrostatic test pressure, minimum metal temperature in the stressed region should be at least the initial reference temperature (RT_{NDT}) for the material in the stressed regions plus any effects of irradiation at the stressed regions. An RT_{NDT} of 40°F, as supplied by Combustion Engineering, was used for the limiting material between the vessel flange and shell juncture. As such, the minimum boltup temperature of 86°F is conservative. One of the limits for the pressure-temperature is not to exceed this 20% pre-operational system hydrostatic test pressure at low operating temperatures.

NRC Question 2

"In the proposed heatup and cooldown P-T limits, figure 3.4-2 and 4, a lowest service temperature was 209°F. How was this temperature derived?"

Edison Response

ASME B&PV Code Section III, Article NB-2332(b) requires pressure retaining materials, other than bolting, with nominal wall thickness over 2-1/2 inches for piping and material for pumps, valves, and fittings with any pipe connections of nominal wall thickness greater than 2-1/2 inches, shall have its lowest service temperature not lower than RT_{NDT} + 100°F unless a lower temperature is justified by following methods similar to those contained in Appendix G. The lowest service temperature is the calculated volumetric average metal temperature expected during normal operation, whenever the pressure within the

component exceeds 20% of the pre-operational system hydrostatic test pressure.

The limiting RT_{NDT} for all Reactor Coolant System materials is 90°F.

$$T_{\text{lowest service temperature}} = RT_{NDT} + 100°F + T_{\text{instrument error}}$$

$$= 90°F + 100°F + 19°F$$

$$= 209°F$$

If you have any questions or would like additional information on this subject, please let me know.

Very truly yours,

Walter C. Ward

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