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J. L. Rainsberry
Manager, Plant Licensing

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

Gentlemen:

Subject: **Docket No. 50-362**
Steam Generator Tube Eggcrate Supports
San Onofre Nuclear Generating Station Unit 3

As requested by the NRC Project Manager for San Onofre Units 2 and 3, enclosed is a table which summarizes design basis information for the San Onofre steam generators which is pertinent to the eggcrate supports. This information is currently being reviewed by Southern California Edison in connection with our evaluation of the areas of degradation observed in the San Onofre Unit 3 eggrate supports.

If you have any questions or would like additional information, please contact me.

Sincerely,

Enclosure

cc: E. W. Merschoff, Regional Administrator, NRC Region IV
K. E. Perkins, Jr., Director, Walnut Creek Field Office, NRC Region IV
J. A. Sloan, NRC Senior Resident Inspector, San Onofre Units 2 & 3
M. B. Fields, NRC Project Manager, San Onofre Units 2 and 3

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San Onofre Unit 3 Steam Generator Eggcrate - Design Basis Analysis Summary

Design Basis	Analysis of Record	Acceptance Criteria	Analysis of Record Quantitative Results
Normal Operating Conditions	Single Tube Analysis	ASME Section III, Class 1 (1971 Edition with Addenda through Summer 1971): a) Primary local membrane plus bending $<1.5\ S_m$ = 35 ksi b) Primary plus secondary SI range $<3S_m$ = 69.9 ksi c) Fatigue usage factor U<1.0	 a) 12 ksi b) 17.3 ksi c) U = 0
Loss of Coolant Accident (LOCA) with Safe Shutdown Earthquake (SSE)	Single Tube Analysis	ASME Section III, Class 1 (1971 Edition with Addenda through Summer 1971): $f_s(0.7\ S_u)$ = 80.6 ksi	Limiting tube row 147, w/64% thickness reduction: 69.9 ksi (1)
Main Steam Line Break (MSLB) with SSE	Single Tube Analysis	ASME Section III, Class 1 (1971 Edition with Addenda through Summer 1971): $f_s(0.7\ S_u)$ = 80.6 ksi	 Limiting tube row 25: 21.9 ksi (1)

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San Onofre Unit 3 Steam Generator Eggcrate - Design Basis Analysis Summary

Design Basis	Analysis of Record	Acceptance Criteria	Analysis of Record Quantitative Results
Normal Operation - Flow Induced Vibration a) Cross flow b) Parallel flow c) RCP impeller d) RCP pressure pulse due to RCP impeller vane interaction	Single Tube Analysis	a) Free stream velocity (V) < critical velocity (V_{cr}) b) Midspan displacement <0.0625" c) Pump freq.< ½ tube natural freq. or > 1.5 tube natural freq: fn_{tube}< 12.7 cps or fn_{tube}>40 cps d) Alternating stress due to pressure pulse good for infinite number of cycles (U=0)	a) V/V_{cr} <=0.45 b) Displacement <= 0.0022" c) fn_{tube} = 49.2 cps d) Alternating stress = 0.958 ksi (limiting tube row 25; U=0)
MSLB Flow Induced Vibration Loads	Single Tube Analysis	Free stream velocity (V) <= critical velocity (V_{cr})	V/V_{cr} <= 0.47

Enclosure

San Onofre Unit 3 Steam Generator Eggcrate - Additional Design Considerations

Design Consideration	Analysis of Record	Acceptance Criteria	Analysis of Record Quantitative Results
Main Steam Line Break (MSLB) with Safe Shutdown Earthquake (SSE)	Eggcrate Evaluation	Maintain tube integrity (2)	Tube integrity maintained (2)
Loss of Coolant Accident (LOCA) with Safe Shutdown Earthquake (SSE)	Eggcrate Evaluation (Whole Bundle) (3)	Maintain tube integrity (4)	Tube integrity maintained (4)

Notes: (1) Stress value shown varies from the value shown in the UFSAR and represents the latest analysis of record.

(2) Manufacturer met this criteria by limiting stresses in the eggcrate lattice bars to 1.05 S_u = 44.1 ksi. Calculated stressed 10.7 ksi.

(3) Design basis analyses performed to support Operating License issuance evaluated only single tube response to design basis events; this design analysis is not part of the original design basis.

(4) There is no specific design basis acceptance criteria associated with this consideration. An analysis was performed to assess alternative methods to control secondary chemistry, and included a uniform corrosion allowance for all lattice bars. Analysis demonstrated that the eggcrates, and therefore the tubes, retained integrity with no credit taken for some of the lattice bars.

Enclosure