UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

February 1, 2001

LICENSEE: South Texas Project Nuclear Operating Company (STPNOC)

FACILITY: South Texas Project Unit 2

SUBJECT: SUMMARY OF MEETING WITH STPNOC REGARDING REQUEST TO REVISE THE TECHNICAL SPECIFICATIONS TO IMPLEMENT 3-VOLT ALTERNATE REPAIR CRITERIA FOR SOUTH TEXAS PROJECT (STP), UNIT 2 STEAM GENERATOR TUBES

On February 21, 2000, South Texas Project Nuclear Operating Company (STPNOC or licensee) proposed to revise the STP, Unit 2 Technical Specifications to implement 3-volt alternate repair criteria for the steam generator tubes for one operating cycle. The U.S. Nuclear Regulatory Commission's (NRC's) staff reviewed the licensee's supporting analyses and found several questions related to induced vibrations, RELAP-5 and its application, steam generator thermal response, and probabilistic safety analysis. In response to the NRC questions, STPNOC initiated a bounding hydrodynamic loads analysis, based on first-principles, to determine bounding loads due to hydrodynamic phenomena during postulated accidents. The licensee requested a meeting with the NRC staff and management to discuss its revised methodology and its results, and to obtain the staff's buy-in of the revised approach.

On December 8, 2000, the NRC's management and staff met with the management and staff of STPNOC, to discuss a bounding approach to meet the 3-volt alternate repair criteria for South Texas Project (STP), Unit 2 steam generators. Enclosure 1 is the list of meeting attendees.

At the subject meeting the licensee presented its revised bounding analysis based on conservative first-principles approach to calculate bounding hydraulic loads and tube support plates deflections. The bounding analysis did not depend upon the use of RELAP-5.

Using the bounding analysis approach, the licensee calculated significant margins for the probability of tube burst for the 3-volt alternate repair criteria. To reduce the uncertainties, the licensee limited the 3-volt alternate repair criteria to the hot leg of three tube support plates above the flow distribution baffle in the steam generators (plates C, F, and J). For additional structural strength, the licensee proposed to expand and lock 16 tubes in place at each of the 3 tube support plates. The licensee presented the results of the bounding analysis at the subject meeting. Enclosure 2 shows the licensee's viewgraphs presented at the December 8, 2000 meeting.

The licensee stated that it will submit a revised Technical Specification package that reflects application of the 3-volt alternate repair criteria for the three tube support plates, and the supporting bounding analysis discussed at the meeting. The licensee also asked for an overall NRC impression of whether the revised approach would meet the NRC's expectations.

NRC 001

The NRC informed the licensee that it did not see any obvious flaws in the licensee's approach. However, the licensee should submit a revised request early to permit a detailed staff review.

/RA/

Mohan C. Thadani, Senior Project Manager, Section 1
Project Directorate IV & Decommissioning
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-499

Enclosures: 1. List of Attendees
2. Viewgraphs

cc w/encls: See next page

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The NRC informed the licensee that it did not see any obvious flaws in the licensee's approach. However, the licensee should submit a revised request early to permit a detailed staff review.

Mohan C. Thadani, Senior Project Manager, Section 1
Project Directorate IV & Decommissioning
Division of Licensing Project Management
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cc w/encls: See next page

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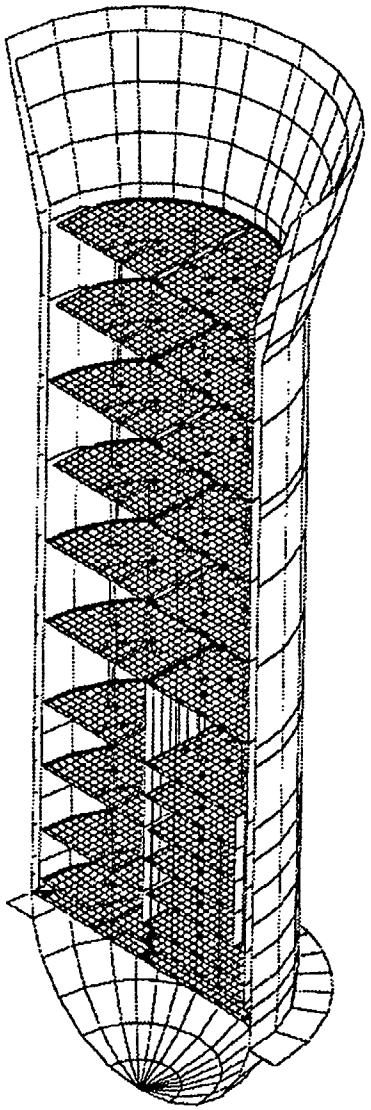
LIST OF ATTENDEES

DECEMBER 8, 2000, MEETING WITH STP NUCLEAR OPERATING COMPANY ON 3-VOLT ALTERNATE REPAIR CRITERIA FOR STP, UNIT 2 STEAM GENERATOR TUBES

NAME	ORGANIZATION
Mark McBurnett	STPNOC
Mark E. Kanavos	STPNOC
James J. Sheppard	STPNOC
Chet McIntyre	STPNOC
Thomas Pitterle	E-Mach Technology
Herman Lagally	Westinghouse
Hans Giesecke	MPR Associates, Inc
T. J. Kim	NRC/NRR
Gary Holahan	NRC/NRR
John A. Zwolinski	NRC/NRR
Warren Lyon	NRC/NRR
Norm Lauben	NRC/RES
John Tsao	NRC/NRR
Frank Akstulewicz	NRC/NRR
Yuri Orechwa	NRC/NRR
Joseph Staudenmeier	NRC/NRR
Jai Rajan	NRC/NRR
Robert Gramm	NRC/NRR
Steve Long	NRC/NRR
Jared Wermiel	NRC/NRR
Mohan Thadani	NRC/NRR
Emmett Murphy	NRC/NRR



South Texas Project
3-Volt Alternate Repair Criteria
NRC Meeting
December 8, 2000

Agenda

• Opening Remarks	Joe Sheppard	5 min
• Experience/Inspection Plan	Mark Kanavos	10 min
• Model E SG	Mark Kanavos	5 min
• Safety/Financial Aspects	Mark Kanavos	5 min
• Submittal/Changes	Mark Kanavos	10 min
• Detailed Discussion	Mark Kanavos	20 min
• Closing Remarks	Joe Sheppard	5 min

SG Operating Experience

- Unit 2 Westinghouse Model E SGs will be replaced in Fall, 2002 - One more cycle
- Predominant degradation is OD axial cracking at lower tube support plates (TSPs)
- Strong SG Management Program - Exceed EPRI guidelines - High marks by experts

4.6 - 4.7% plugged

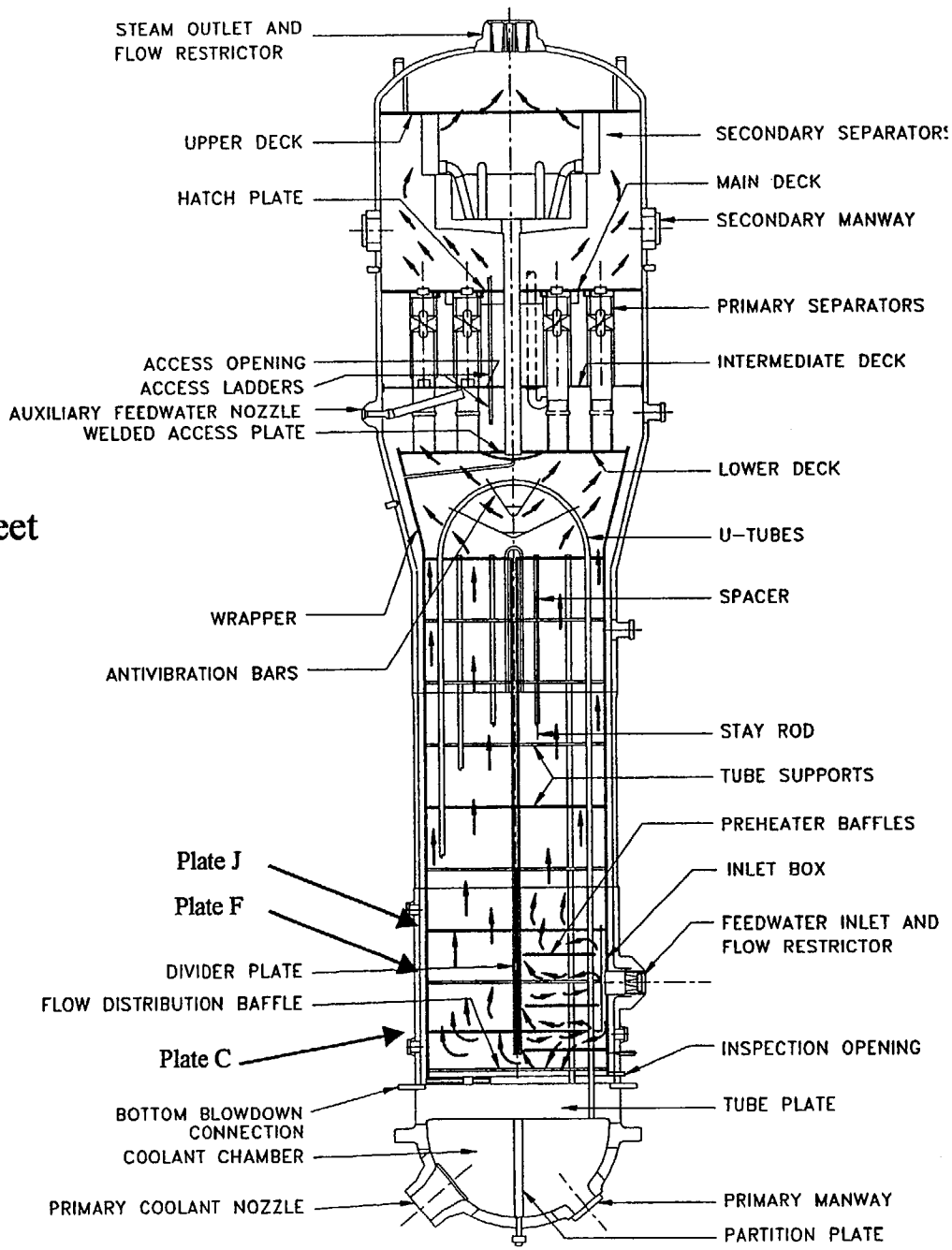
3 volt 100 tubes

1 volt → 1200 - 1300 tubes → 10% plugging limit

Spring 2002 SG Inspection Plan

- +Point all DSIs > 1 Volt and all DSIs > 0.75 Volts with > 0.75 Volt/cycle growth
- Plug all DSIs > 3 Volts and preventively plug DSIs > 0.75 Volts based on known ECT morphology
- Objective – Ensure safe Cycle 9 operation, minimize potential operational leakage and no unwarranted mid-cycle inspection

Overall length 74 feet



(REACTOR COOLANT OUTLET NOT SHOWN)

Safety Aspects of 3 Volt Application

- Maximizes core flow margins for normal operation.
- Maximizes margin to plant trip (OT/OPΔT)
- Maintains significant margin to GL 95-05 burst probability
- Lowers dose from unnecessary plugging
- Full power operation for cycle 9 without unwarranted mid-cycle inspection outages with hot core mid-loop operations and associated personnel radiation exposure

Financial Aspects of 3 Volt Application

- $3.5 million exposure due to unnecessary tube plugging in 2RE08 (March 2001)
- $7 - 10 million exposure per outage due to unwarranted mid-cycle inspections on SGs that will be replaced in Fall, 2002

3-Volt ARC Submittal

- License 3-Volt at 5 lower hot leg support plates
- SLB Support Plate transient loading determined by RELAP5 code
- Plate Deflections determined from WECAN
- Highest loading at hot standby condition
- DSIs treated as indication restricted from burst (IRB) due to limited plate deflection

Proposed Changes

- Lower 3 hot leg support plates only (plates C,F,J)
  - Eliminates influence of preheater section
- Selected tube expansions to limit plate deflections
- Simple conservative bounding analysis, independent of RELAP

Bounding TSP Displacements

- Model TSP structure with WECAN
  - Calculate displacements and stresses
  - Maintain TSPs elastic
- TSPs remain elastic up to 3.5 psi ΔP without tube expansions
  - Maximum local displacement ~0.15”
- Apply increasing load
  - Expand tubes as necessary to keep TSP elastic
- TSPs remain elastic up to 28 psi ΔP with ~12 tube expansions
  - Maximum local displacement ~0.3”

Bounding Hydraulic Loads

- Initial swell from hot standby results in maximum hydraulic loads
- Loads on any plate can be bounded by applying worst case plate ΔP to first 3 TSPs
- Case 1: Assume downcomer blocked; all flow through TSPs is upward through top TSP
  - Top support plate ΔP is bounding (<3 psi)
- Case 2: Conservatively assume half of flow is down
  - Bottom support (not FDB) plate ΔP (<3 psi) is bounding
- Bounding Δp is larger of cases 1 and 2

Conclusions

- Can calculate conservative bounding loads
- Provide significant safety factor on bounding loads with tube expansions
- Burst probability is negligibly low