ENCLOSURE 2

April 5, 1988

MEMORANDUM FOR: C. Y. Cheng, Chief
Materials Engineering Branch
Division of Engineering and System Technology

FROM: Byron Siegel, Acting Coordinator
B&W Owners Group Generic Activities
Project Directorate - IV
Division of Reactor Projects - III,
IV, V and Special Projects

SUBJECT: FORTHCOMING MEETING WITH B&W OWNERS GROUP
STEAM GENERATOR COMMITTEE

DATE & TIME: April 14, 1988
10:00 a.m.

LOCATION: 14 B 13
One White Flint North
11555 Rockville Pike
Rockville, Maryland 20852

PURPOSE: To discuss B&W Owners Group Steam Generator Committee accomplishments and activities during 1987 and plans for 1988 and beyond (See attached agenda).

*PARTICIPANTS:

NRC	B&W Owners Group
B. Siegel	G. Capodanno, Chairman
J. Richardson	A. Buford
K. Wichman	R. Baker
C.Y. Cheng	D. Tate
E. Murphy	G. Cowles
H. Conrad	H. Mahlman
J. Muscara	S. Sloserick
C. Serpan	
R. Dudley	

/s/

Byron Siegel, Acting Coordinator
B&W Owners Group Group Generic Activities
Project Directorate - IV
Division of Reactor Projects - III,
IV, V and Special Projects

cc: See next page

*Meetings between NRC technical staff and applicants or licensees are open for interested members of the public, petitioners, intervenors, or other parties to attend as observers pursuant to "Open Meeting Statement of NRC Staff Policy," 43 Federal Register 28058, 6/28/78.

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BSiegel:sr
04/05/88

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B&W OWNERS GROUP

STEAM GENERATOR COMMITTEE

PRESENTATION TO NRC

AGENDA

I.	INTRODUCTION	G. R. CAPODANNO
II.	B&WOG ORGANIZATION & FUNCTIONS	G. R. CAPODANNO
III.	STEAM GENERATOR COMMITTEE ORGANIZATION & FUNCTIONS	G. R. CAPODANNO
IV.	1987 STEAM GENERATOR COMMITTEE ACCOMPLISHMENT/ACTIVITIES	A. BUFORD
V.	PLANS FOR 1988 AND BEYOND	A. BUFORD

B&W OWNERS GROUP

STEAM GENERATOR COMMITTEE

PRESENTATION TO NRC

APRIL 14, 1988

B&W OWNERS GROUP

STEAM GENERATOR COMMITTEE

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B&W OWNERS GROUP

OWNERS

ARKANSAS POWER AND LIGHT CO.

DUKE POWER COMPANY

FLORIDA POWER CORP.

GENERAL PUBLIC UTILITIES

SACRAMENTO MUNICIPAL UTILITIES DISTRICT

TOLEDO EDISON COMPANY

TENNESSEE VALLEY AUTHORITY

MEMBERSHIP

ALL OWNERS ARE MEMBERS OF EPRI AND THE EPRI STEAM GENERATOR RELIABILITY PROJECT (SGRP).

INTERFACES

INTERFACES WITH EPRI ARE ACCOMPLISHED VIA JOINT MEETINGS.

B&W OWNERS GROUP
CHARTER

PURPOSE

IDENTIFY PROBLEMS AND SOLUTIONS RELATED TO OPERATION OF B&W-DESIGNED NSS TO ACHIEVE HIGH PLANT AVAILABILITY, IMPROVE SAFETY AND REDUCE COSTS.

OBJECTIVES

A. IMPROVE PLANT SAFETY AND AVAILABILITY.

B. IDENTIFY AND OVERSEE TIMELY RESOLUTION OF GENERIC ISSUES AFFECTING PLANT PERFORMANCE, SAFETY OR LICENSING.

C. STRIVE FOR TIMELY PURSUIT OF JOINT TASKS WITH DUE RECOGNITION OF INDIVIDUAL NEEDS OF PARTICIPATING UTILITIES.

D. PROVIDE EFFECTIVE METHOD FOR COMMUNICATIONS WITH NRC AND IMPLEMENT COMMUNICATIONS.

E. PROVIDE EFFECTIVE VEHICLE FOR COMMUNICATING B&WOG INTERESTS TO INPO, EPRI, AND OTHER INDUSTRY ORGANIZATIONS.

F. IMPROVE COMMUNICATIONS BETWEEN MEMBERS ON NON-GENERIC ISSUES.

G. PROVIDE METHOD OF EFFECTIVELY AND EFFICIENTLY MANAGING COST AND SCHEDULES RELATIVE TO THE RESOLUTION OF GENERIC ISSUES.

B&W OWNERS GROUP

ORGANIZATION

EXECUTIVE COMMITTEE

STEERING COMMITTEE

TECHNICAL COMMITTEES

- ANALYSIS
- ATWS
- AVAILABILITY
- CORE PERFORMANCE
- MATERIALS
- NONDESTRUCTIVE EXAMINATION
- OPERATOR SUPPORT
- STEAM GENERATOR
- TECHNICAL SPECIFICATION
- TRANSIENT ASSESSMENT
- I&C WORKING GROUP
- VALVE TASK FORCE
- LIFE EXTENSION

THE OWNERS GROUP ADDRESSES ISSUES VIA FOUR PROGRAMS:

1. TRIP REDUCTION AND TRANSIENT RESPONSE IMPROVEMENT PROGRAM (TR/TRIP)
2. AVAILABILITY IMPROVEMENT PROGRAM (AIP)
3. ECONOMIC BENEFIT PROGRAM (EBP)
4. SAFETY, REGULATORY COMMITMENT AND MANAGEMENT (SRCM)

EXECUTIVE COMMITTEE RESPONSIBILITIES

° ESTABLISHES POLICIES

° PROVIDES STRATEGIC GUIDANCE

STEERING COMMITTEE RESPONSIBILITIES

- RECEIVE AND REVIEW THE PROGRAM SHORT AND LONG RANGE PLANS

  ° COMPILE A B&WOG SHORT AND LONG RANGE PLAN

- ACT TO DISPOSITION RECOMMENDATIONS FORWARDED BY COMMITTEES AND PROGRAMS

TECHNICAL COMMITTEE RESPONSIBILITIES

- IDENTIFY PROJECTS TO ACHIEVE GOALS
- PREPARE LONG AND SHORT RANGE PLANS
- SUBMIT PLANS TO PMT FOR APPROVAL
- FORWARD RECOMMENDATIONS TO PROGRAM DIRECTORS FOR REVIEW AND ENDORSEMENT
- MONITOR PROGRESS AND TECHNICAL ASPECTS OF PROGRAMS
- REVIEW FOR APPROVAL TECHNICAL REPORTS PRIOR TO ISSUE

B&W OWNERS GROUP
STEAM GENERATOR COMMITTEE
CHARTER

PURPOSE

THE COMMITTEE WAS ESTABLISHED TO IDENTIFY PROBLEMS AND DEVELOP SOLUTIONS TO PROBLEMS RELATED TO THE OPERATIONAL INTEGRITY AND RELIABILITY OF THE B&W DESIGNED ONCE-THROUGH STEAM GENERATOR IN ORDER TO:

- MAINTAIN SAFETY
- ACHIEVE HIGH PLANT AVAILABILITY/CAPACITY
- REDUCE OPERATING COSTS

B&W OWNERS GROUP
STEAM GENERATOR COMMITTEE
CHARTER CONT'D

STEAM GENERATOR COMMITTEE PROGRAM OBJECTIVES

FOCUS IS STEAM GENERATOR INTEGRITY AND RELIABILITY

- ASSURE STRONG INTERFACE WITH OTHER INDUSTRY ORGANIZATIONS
- PREVENT PROLONGED PLANT SHUTDOWNS OR STEAM GENERATOR REPLACEMENT
- MINIMIZE FORCED OUTAGES CAUSED BY STEAM GENERATOR PROBLEMS
- AVOID POWER REDUCTIONS DUE TO STEAM GENERATOR PROBLEMS
- MAXIMIZE STEAM GENERATOR OPERATING LIFE AND PROVIDE PROTECTION FROM CURRENTLY KNOWN CAUSES OF DEGRADATION
- IDENTIFY NEW PROBLEM AREAS AS THEY ARISE

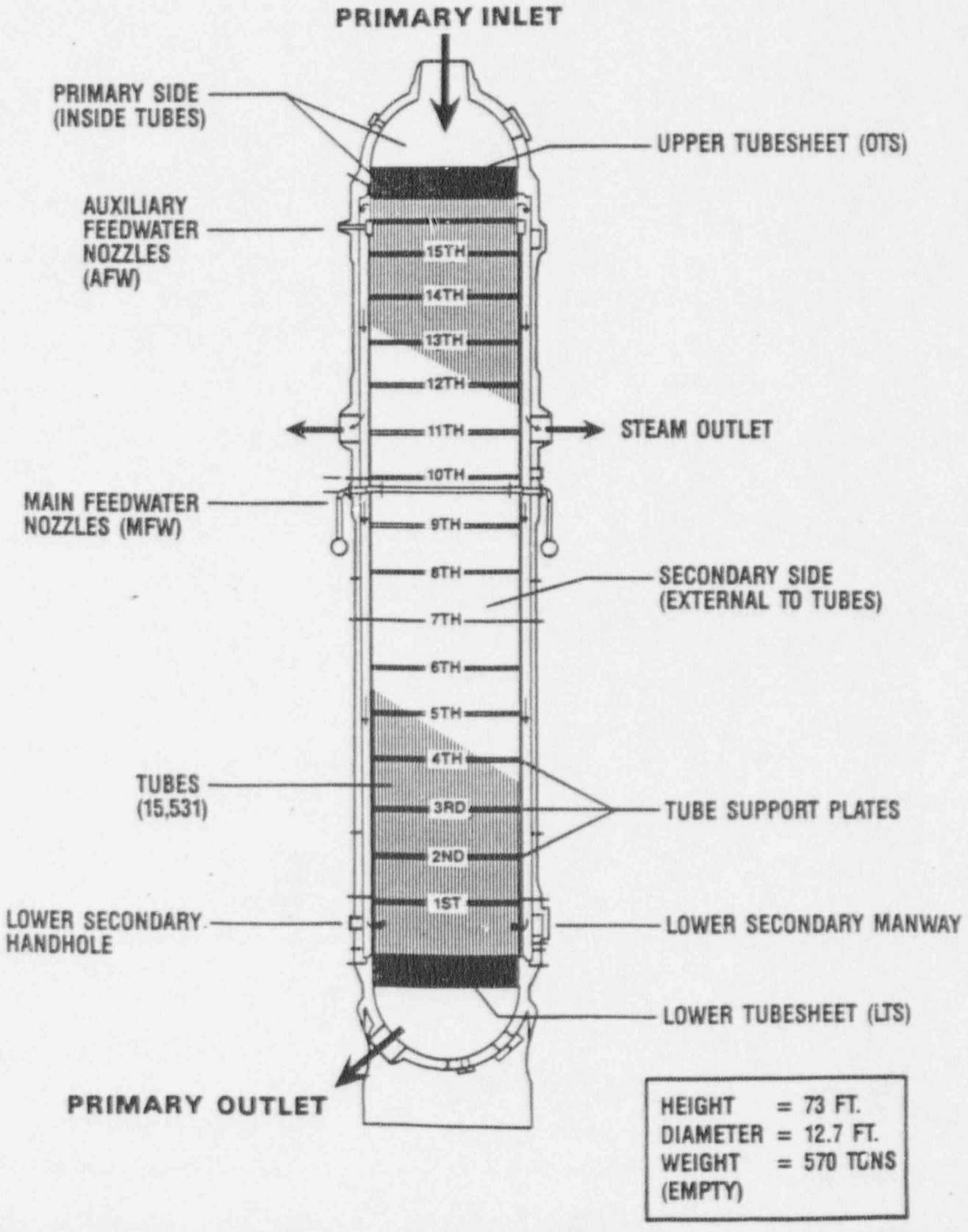
B&W OWNERS GROUP

STEAM GENERATOR COMMITTEE

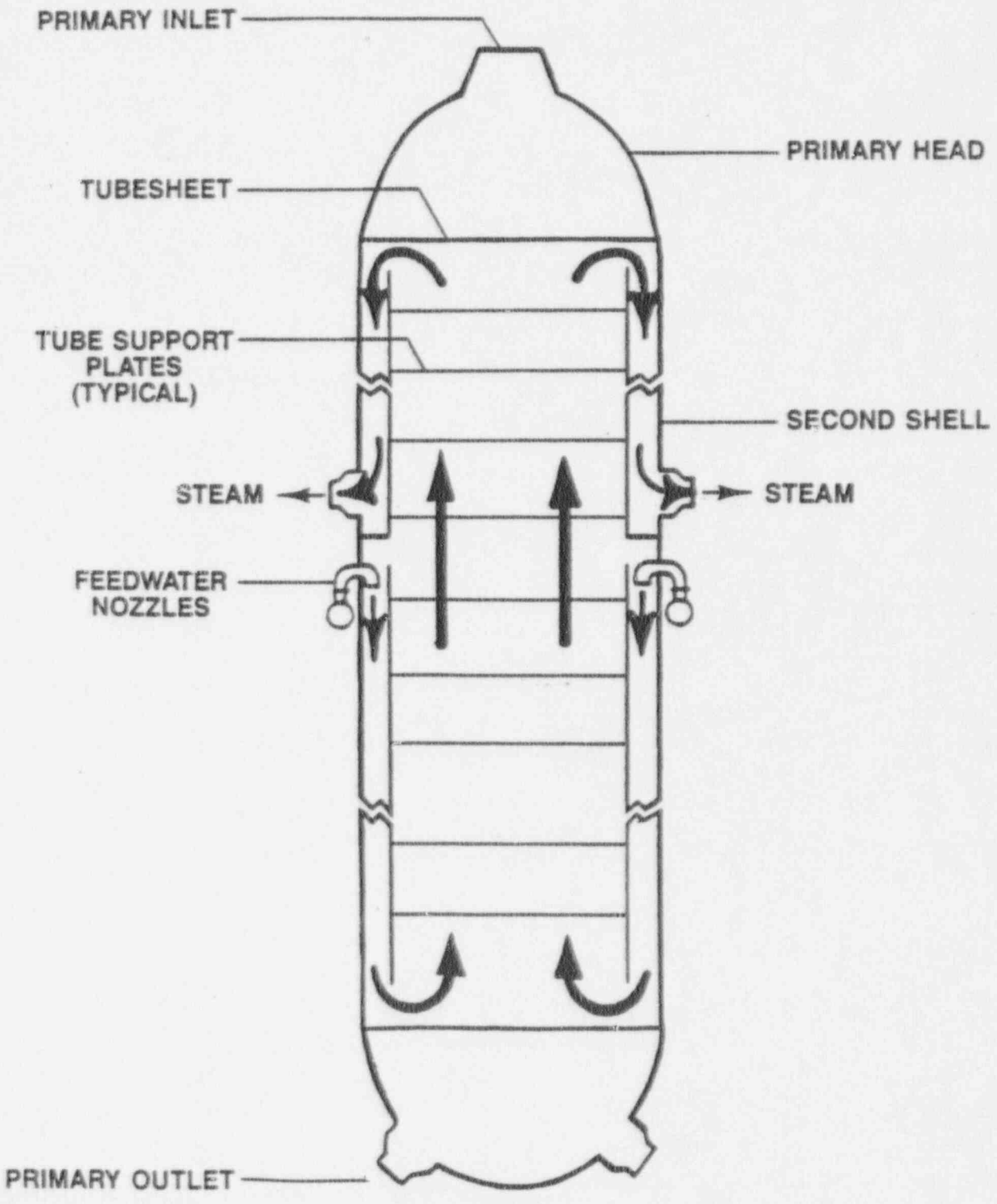
MEMBERS

G. CAPODANNO	- GPUN	CHAIRMAN
S. SLOSNERICK	- TED	VICE CHAIRMAN
H. MAHLMAN	- TVA	
R. WICHERT	- SMUD	
R. EAKER	- DPCO	
G. COWLES	- FPC	
A. BUFORD	- AP&L	

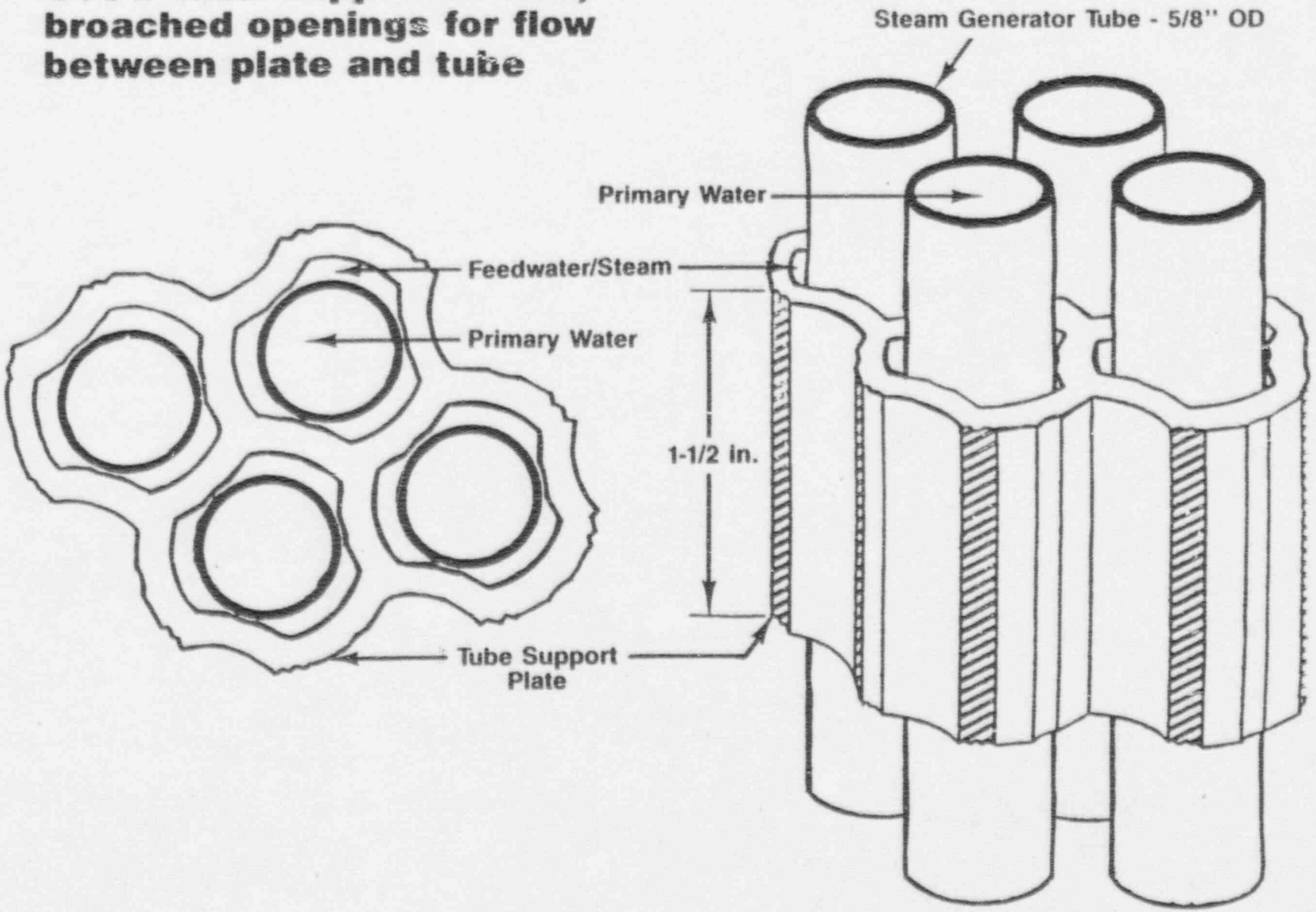
Steam Generator (OTSG)



OTSG Feedwater - Steam Production



OTSG Tube Support Plates, broached openings for flow between plate and tube



1987 STEAM GENERATOR COMMITTEE ACCOMPLISHMENTS/ACTIVITIES

A. TUBE INTEGRITY

B. SECONDARY SIDE FOULING

C. ADDITIONAL PROJECTS

PLANS FOR 1988 AND BEYOND

A. TUBE INTEGRITY

B. SECONDARY SIDE FOULING

C. ADDITIONAL PROJECTS

1987 ACCOMPLISHMENTS/ACTIVITIES

A. TUBE INTEGRITY

1. TUBE PLUGGING CRITERIA PROGRAM

A) INTERFACE MEETING WITH EPRI ON SGRP TASKS RELATIVE TO OTSGs

B) SURVEYED TUBE DEFECT TYPES FOUND IN OTSGs

C) INITIATED ANALYSIS INPUTS REVIEW FOR TUBE LOADS

D) HELD WORKSHOP ON STATUS AND PLAN 1988 ACTIVITIES

2. PRELIMINARY EVALUATION OF LEAKER OUTAGES FOR INPUT INTO 1988 PROGRAM

3. INTERFACED WITH NDE COMMITTEE TO DEFINE/PRIORITIZE 1988 NDE COMMITTEE ACTIVITIES THAT SUPPORT OTSG COMMITTEE

B. SECONDARY SIDE FOULING

1. WATER SLAP ENHANCEMENT TO IMPROVE REMOVAL OF BROACHED HOLE BLOCKAGE BY USE OF INCREASED NITROGEN PRESSURE

2. CHEMISTRY WORKSHOP FOR ENHANCED SLUDGE REMOVAL

A) SHORT TERM - EVALUATED MILD CHEMICAL SOAK TO REMOVE SLUDGE AND/OR ENHANCE WATER SLAP (E.G., BORIC ACID, HYDRAZINE, MORPHOLINE)

B) LONG TERM (POSSIBLE FUTURE PROGRAMS) TO ENHANCE SLUDGE REMOVAL AND/OR PREVENT DEPOSITION (E.G., POLYMERS, CHELANTS, ETC.)

1987 ACCOMPLISHMENTS/ACTIVITIES

3. PREVENTATIVE MEASURES WORKSHOP

A) MORPHOLINE ADDITION FOR pH CONTROL

B) HIGH TEMPERATURE POLISHER SYSTEMS

C) IMPROVED SLUDGE LANCING TECHNIQUES

D) REROUTING MOISTURE SEPARATOR DRAINS

E) ELECTROMAGNETIC FILTERS

F) CONDENSATE POLISHER OPERATION

4. FLAKE SPALLING STUDY

5. OCONEE CHEMICAL CLEANING PROGRAM REPORT

C. ADDITIONAL PROJECTS/ACTIVITES

1. AVAILABILITY COMMITTEE INTERFACE MEETING

2. EPRI COORDINATION MEETING

3. OTSG LIFE EXTENSION PROGRAM PLAN

4. PLANT-TO-PLANT TRENDING REPORT (REV. 3) DATA COLLECTION

PLANS FOR 1988 AND BEYOND

A. TUBE INTEGRITY

1. 1988/1989 SHORT RANGE PLAN

A) TUBE PLUGGING CRITERIA

INTEGRATE RESULTS OF 1987 PROGRAM WITH EPRI WORK TO PROVIDE REVISED TUBE AND SLEEVE PLUGGING LIMITS FOR THE DAMAGE MECHANISMS IDENTIFIED IN OPERATING OTSG.

B) WORK WITH BWOG NDE COMMITTEE AND SGRP ON INSPECTION GUIDELINES.

C) CORRELATE NDE, CHEMISTRY AND TUBE PULL DATA TO PLANT LEAKER HISTORIES TO INCREASE UNDERSTANDING OF LEAKERS.

D) FEASIBILITY STUDY FOR METHODS OF UTS FLUSHING.

E) ASSESS INDUSTRY LITERATURE ON TUBE DAMAGE MECHANISMS AS APPLICABLE TO OTSGs.

B. SECONDARY SIDE FOULING

1. 1988/1989 SHORT RANGE PLANS

A) EVALUATION OF ADDITIONAL ENHANCEMENTS TO WATER SLAP.

B) COMPLETE THE ENGINEERING EVALUATION OF FLAKES AND SPALLING.

C) EVALUATION OF KWU CHEMICAL CLEANING PROCESS AS AN ALTERNATIVE TO EPRI SGOG PROCESS.

PLANS FOR 1988 AND BEYOND

D) COMPLETE THE HIGH TEMPERATURE PURIFICATION SYSTEM EVALUATION.

E) QUALIFY ON-LINE MORPHOLINE ADDITION AND IMPLEMENT AT OTSG SITE(S).

F) SECONDARY SIDE DEPOSITION MODEL.

G) PLAN TO CONTROL/MINIMIZE SECONDARY SIDE FOULING.

2. LONG RANGE PLANS

A) CONTINUE TO WORK ON SECONDARY SIDE FOULING, TUBE INTEGRITY, LIFE EXTENSION AND RELATED PROJECT RESULTS, AND IDENTIFY NEW PROJECTS AS APPROPRIATE.

B) DEVELOP ADDITIONAL METHODS TO REDUCE CORROSION PRODUCT GENERATION AND TRANSPORT.

C. ADDITIONAL PROJECTS

1. DEVELOP OTSG NOZZLE DAMS

2. OTSG LIFE EXTENSION PROGRAM

3. COMPLETE OTSG PLANT-TO-PLANT TRENDING REPORT

4. COORDINATE WITH EPRI ON VARIOUS PROJECTS

APPENDIX A

B&W OWNERS GROUP
STEAM GENERATOR COMMITTEE
1988/89 ACTIVITIES

I. TUBE INTEGRITY PROJECTS

A. Revision of Tube and Sleeve Plugging Criteria

Objective - Develop revised tube and sleeve plugging criteria for OTSG tubes.

Scope - Review known tube defects and tube loads. Develop revised tube and sleeve plugging criteria. (This project will be conducted to take maximum advantage of similar EPRI programs.)

Expected Results - Revised tube and sleeve plugging limits for each damage mechanism type identified in operating OTSGs.

B. Correlate NDE, Chemistry, and Tube Pull Data to Plant Leaker Histories

Objective - Correlate secondary system water chemistry, NDE, tube pull data with OTSG tube leaks to determine tubes most likely to become leakers and reasons why.

Scope - Review available data and perform engineering evaluation to obtain correlations between operating and layup experience and tube leaks.

Expected Results

1. Guidelines to decrease incidence of OTSG tube leak outages.

2. Recommendations with respect to preventive sleeving.

C. Methods for Upper Tubesheet Flushing

Objective - Determine methods to flush OTSG upper tubesheet crevices during plant shutdown to remove chemical contaminants which contribute to tube corrosion.

Scope - Review procedures which have been used to flush recirculating steam generator (RSG) tubesheets and OTSG lower tubesheets. Identify possible approaches for use on upper tubesheet. Develop method which can be used for the upper tubesheet.

Expected Results - set of guidelines for flushing OTSG upper tubesheet crevices.

D. Tube Secondary Side IGA Evaluation

Objective - Improve understanding of causes for secondary side IGA.

Scope - Collect/evaluate available eddy current data, tube sample laboratory examination results, plant operating history data for possible correlations between individual plant histories and secondary side IGA. Identify possible follow-on activities.

Expected Results - Improved understanding of causes for secondary side IGA and technical basis for plants to avoid conditions conducive to IGA.

E. Assess Industry Literature on Tube Damage Mechanisms as Applicable to OTSGs

Objective - Improve understanding of known tube degradation mechanisms not seen in OTSGs.

Scope - Compile and evaluate existing and available industry data on tube degradation mechanisms. Compare the causes of these mechanisms to the design and operational characteristics of the OTSG. Determine susceptibility or immunity of OTSG to these damage mechanisms.

Expected Results - Knowledge of the tube damage types, causes, and plant or design conditions conducive to tube damage in the industry. Understand how these compare to OTSG conditions.

II. SECONDARY SIDE FOULING PROJECTS

A. Water Slap (W/S) Enhancement

Objective Improve ability of W/S to remove broached hole deposits.

Scope -

1) Testing/analysis to qualify and optimize increased nitrogen pressure or number of cycles.

2) Feasibility testing and qualification of mild abrasives to enhance W/S.

Expected Results - Remove enough deposit to enable the plant to reach and maintain full power operation for at least 1 fuel cycle.

B. Engineering Evaluation of Flakes and Spalling

Objective - Determine characteristics of OTSG tube scale (Flakes), and identify the parameters that affect flake spalling from tube surfaces.

Scope - Determine physical and chemical characteristics of flakes. Determine if spalling can be controlled to prevent step increases in OTSG pressure drop. Develop special procedures to induce spalling in controlled manner to enhance deposit removal.

Expected Results - Develop a more complete understanding of the physical and chemical properties of flakes, ways in which they form, conditions under which they come off tubes. Formulate actions which might be implemented to lessen adverse effects of flakes and flake spalling on the pressure drop problem in OTSGs.

C. Evaluation of KWU Chemical Cleaning Process

Objective - Qualify an alternate to the EPRI/SGOG chemical cleaning process.

Scope - Perform independent technical evaluation and qualification of KWU high temperature chemical cleaning process for OTSGs.

Expected Results - A qualified KWU process may have advantages in ease of application and cost.

D. High Temperature Purification System (HTPS)

Objective - Determine ability of high temperature polishing system for pumped forward drains to improve feedwater chemistry by reducing the transport of contaminants to the OTSGs.

Scope - Monitor operation and chemical performance of upgrade prototype HPTS installation at Davis Besse for normal plant operation.

Expected Results - Verify performance of HPTS system.

E. Qualify On-Line Morpholine Addition

Objective - Qualify replacement of ammonia with morpholine as a secondary water chemistry pH control agent to reduce erosion/corrosion of secondary piping and subsequent transport of iron oxides to the OTSGs.

Scope - Under contract to EPRI, B&W will monitor industry experience with on-line use of morpholine, conduct morpholine-form condensate polishing test (bench-scale plant), and perform final generic on-line qualification of morpholine use at operating OTSG's plants.

Expected Results - Qualify on-line use in morpholine in OTSGs.

F. Secondary Side Measures to Minimize Corrosion Transport

Objective - Identify secondary system water chemistry operations and procedures which can be used to minimize corrosion of the OTSG and other secondary system components.

Scope - Review current plant practices to identify areas of possible improvements.

Expected Result - Identify recommendations for improvements to secondary system water chemistry operations to minimize corrosion of components and admittance of corrosion products into the OTSGs.

G. Secondary Side Deposition Model

Objective - Analytically model the corrosion product transport and deposition phenomenon on the secondary side of OTSGs.

Scope - Review and upgrade existing OTSG deposition model. Determine effects of heat flux, time, corrosion product concentration, and selected water chemistry parameters upon deposition location and deposition remedies.

Expected Results - Improve understanding of the OTSG fouling problem and develop possible remedies.

H. Plan to Control/Minimize Secondary Side Fouling

Objective - Develop integrated plan to control/minimize OTSG secondary side fouling.

Scope - Collect all available information concerning causes, preventive measures, and remedies of OTSG fouling into a guideline document which utilities can use to address the fouling problem.

Expected Results - An integrated plan to control/minimize OTSG secondary side fouling which eliminates duplication of effort between organizations.

I. Additional Qualification Test for Chemical Cleaning

Objective - Provides for possibility that technical evaluation of KWU chemical cleaning process may require additional qualification testing.

Scope - Perform additional qualification testing of KWU chemical cleaning process for OTSGs.

Expected Results - Qualification of KWU Chemical Cleaning process for OTSGs.

III. ADDITIONAL PROJECTS

A. Nozzle Dams

Objective - Make available to OTSG owners the generic nozzle dam design and installation technology developed by Duke Power Co..

Scope - Cold leg nozzle dams have been successfully installed at Oconee Units 1 and 2. Duke Power Co. funded the development and testing of the nozzle dam design and installation techniques for Oconee. This project will provide the base and generic design information to other OTSG owners so that nozzle dams can be installed at their plants.

Expected Results - Design and specification information and data to allow purchase and installation of nozzle dams at other OTSG plants.

B. OTSG Life Extension

Objective - Identify major tasks required to preserve the life extension option of OTSGs.

Scope - Develop OTSG Life Extension Plan.

Expected Results - Determination of possible life limiting aspects of OTSG components.

C. Plant-to-Plant Trending Report

Objective - Trend and evaluate OTSG and secondary system data for purpose of determining plant-to-plant similarities and differences that may affect tube integrity and secondary side fouling.

Scope - Establish OTSG data base consisting of eddy current, profilometry, thermal-hydraulic, water chemistry, secondary system plant arrangement data, and plant performance data. Perform plant-to-plant comparisons.

Expected Results - Determine plant-to-plant similarities and differences that may affect tube integrity and secondary side fouling.