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

Bob Martin

MAY 07 1982

MEMORANDUM FOR: Thomas A. Ippolito, Chief
Operating Reactors Assessment Branch
Division of Licensing

FROM: Keith R. Wichman, Section Leader
Engineering Section
Operating Reactors Assessment Branch
Division of Licensing

SUBJECT: MEETING WITH STEAM GENERATOR OWNERS GROUP

Attached is a summary of the subject meeting that was held on April 29, 1982 in Bethesda. The Steam Generator Owners Group described their views with respect to their organization and both past and current activities. A list of attendees and a copy of the slides used during the meeting are shown in the Enclosures to the summary.

K. R. Wichman

Keith R. Wichman, Section Leader
Engineering Section
Operating Reactors Assessment Branch
Division of Licensing

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MAY 07 1982

MEETING SUMMARY DISTRIBUTION

NRC/PDR
Local PDR
H. Denton
E. Case
D. Eisenhut
R. Purple
B. Youngblood
A. Schwencer
F. Miraglia
J. Miller
G. Lainas
R. Vollmer
J.P. Knight
R. Bosnak
R. Schauer
R.E. Jackson
IE (3)
ACRS (16)
R. Tedesco
N. Hughes
J. Reisland
R. Jacobs

NRC Participants:

L. Frank
C. Cheng
S. Hanauer
H. Denton
D. Eisenhut
P. Norian
K. Wichman
W. Koo
T. Novak
R. Vollmer
C. McCracken
T. Ippolito
W. Johnston
E. Igne
E. Brown
R. Birkel
R. Tedesco
E. Jordan
L. Shao

Other Attendees:

P. Trembley
M. Tramp
J. Griffith
N. Chapman
R. Borsum
G. Lear
W. Hazelton
V. Benaroya
Z. Rosztoczy
W. Haass
D. Muller
R. Ballard
W. Regan
R. Mattson
P. Check
O. Parr
F. Rosa
W. Butler
W. Kreger
R. Houston
W. Gammill
L. Rubenstein
T. Speis
W. Johnston
S. Hanauer
T. Murley
F. Schroeder
D. Skovholt
M. Ernst
K. Kniel
G. Knighton
A. Thadani
D. Tondi
J. Kramer
D. Vassallo
P. Collins
D. Ziemann
F. Congel
J. Stolz
M. Srinivasan
W. Minners
C. Berlinger
E. Adensam

SGOG Participants:

R. Mecredy
P. Santoro
L. Rylander
A. Schmidt
D. Noble
R. Garnsey
J. Lang
J. Berga
S. Green
J.P. Paine

SUMMARY OF MEETING WITH STEAM GENERATOR OWNERS GROUP (SGOG)

ON APRIL 29, 1982, REGARDING SGOG SPONSORED STEAM GENERATOR PROGRAMS

A meeting was held between SGOG representatives and NRC staff members on April 29, 1982 at Bethesda, Maryland. A copy of the slides used by the SGOG during the presentation and a list of the attendees of this meeting are enclosed.

The SGOG representatives presented an overview of their organization and activities. SGOG was formed in 1977 and consists of twenty (20) domestic utilities and three foreign utilities with program funding of about 36 million dollars through 1982. The main functions of SGOG are to provide members with tools to deal with the on-going steam generator problems and to establish generic research and development (R&D) programs to resolve such problems. The SGOG sponsored R&D programs are solution oriented and are managed by the Steam Generator Project Office of Electric Power Research Institute (EPRI).

SGOG highlighted the on-going programs and the results of their sponsored work, which are focused on the solution to control of steam generator tube denting and wastage corrosion in nuclear power plants. The program test results indicated that the tube denting can be arrested by additions of neutralizer ($Ca(OH_2)$ and H_3BO_3) and/or improved water chemistry control. This was further demonstrated by several operating units. Other measures such as changing the tube support structure material from carbon steel to ferritic stainless steel and improved tube support plate hole design have also shown to increase resistance to tube denting. SGOG also reported that the sludge formation in the secondary side can be controlled by instituting chemistry control, flushing and the reduction of air leakage in the system.

The forming of a new SGOG is reported to be underway. The new SGOG will continue to sponsor R&D programs for the period from 1983 to 1986 to address the current steam generator issues with a tentative program funding of 22 to 27 million dollars. Programs that are underway or planned to address the current steam generator issues were described. These were identified as (1) intergranular attack and stress corrosion cracking on the secondary side such as in tube-to-tubesheet crevices, at tubesheet faces, in the sludge pile and at other locations in the tube bundle, (2) stress corrosion cracking in primary water such as in tube U-bend and expansion transition areas, (3) tube pitting under lay-up conditions, and (4) mechanical damage of tubes due to fatigue, fretting and wear.

Keith R. Wichman
Operating Reactors Assessment Branch
Division of Licensing

Enclosure:
As Stated

cc: See next page

ATTENDANCE LIST

STEAM GENERATOR OWNERS GROUP (SGOG) AND NRC STAFF

MEETING ON STEAM GENERATOR PROBLEMS

APRIL 29, 1982

NRC Participants

L. Frank, DE
C. Cheng, DE
S. Hanauer, DST
H. Denton, NRR
D. Eisenhut, DL
P. Norian, DST
K. Wichman, DL
W. Koo, DL
T. Novak, DL
R. Vollmer, DE
C. McCracken, DE
T. Ippolito, DL
W. Johnston, DE
E. Igne, ACRS
E. Brown, AEOD
R. Birkel, DL
R. Tedesco, DL
E. Jordan, IE
L. Shao, RES

Other Attendees

P. Trembley, NUS
M. Tramp, NUTECH
J. Griffith, DOE
N. Chapman, Bechtel
R. Borsum, B&W

SGOG Participants

P. Mecredy, RG&E
P. Santoro, NEU
L. Rylander
A. Schmidt, FP&L
D. Noble, CP
R. Garnsey
J. Lang, EPRI
J. Berga, EPRI
S. Green, EPRI
J.P. Paine, EPRI

PRESENTATION BY

STEAM GENERATOR OWNERS GROUP

TO

NRC STAFF

APRIL 29, 1982

HISTORY OF THE STEAM GENERATOR OWNERS GROUP

- 1974 - WASTAGE CAUSED INDUSTRY TO SHIFT TO ALL VOLATILE TREATMENT (AVT) WATER CHEMISTRY
- 1975 - "DENTING" DISCOVERED IN MANY UNITS
- 1976 - DENTING FORCED OUTAGES
  - "DENTED USERS GROUP" FORMED
  - SGOG CONCEIVED AND EPRI SUPPORT APPROVED
- 1977 - SGOG FORMED
  - EPRI SGPO ESTABLISHED
  - VENDORS AGREED TO SHARE COSTS OF PROGRAM
- 1978 - SGOG WORK STARTED

STEAM GENERATOR OWNERS GROUP MEMBER UTILITIES

ARIZONA NUCLEAR POWER PROJECT

ARKANSAS POWER AND LIGHT COMPANY

BALTIMORE GAS AND ELECTRIC COMPANY

CAROLINA POWER AND LIGHT COMPANY

CENTRAL ELECTRICITY GENERATING BOARD (CEGB)

CRIEPI (JAPAN)

COMMONWEALTH EDISON COMPANY

CONSOLIDATED EDISON COMPANY OF NEW YORK

CONSUMERS POWER COMPANY

DUKE POWER COMPANY

ELECTRICITE DE FRANCE

FLORIDA POWER & LIGHT COMPANY

GEORGIA POWER COMPANY

HOUSTON LIGHTING AND POWER COMPANY

NORTHEAST UTILITIES

PORTLAND GENERAL ELECTRIC COMPANY

POWER AUTHORITY OF THE STATE OF NEW YORK

PUBLIC SERVICE ELECTRIC AND GAS CO.

ROCHESTER GAS AND ELECTRIC CORP.

SOUTHERN CALIFORNIA EDISON COMPANY

SWEDISH STATE POWER BOARD

TENNESSEE VALLEY AUTHORITY

WISCONSIN ELECTRIC POWER COMPANY

PRIOR NRC - STEAM GENERATOR OWNERS GROUP MEETINGS

DATE	MEETING
JANUARY 22, 1982	ENGINEERING BRANCH NRC DIVISION OF OPERATING REACTORS BETHESDA, MD
JANUARY 23, 1980	SUBCOMMITTEE ON METAL COMPONENTS ACRS WASHINGTON D.C.
AUGUST 11, 1980	CHEMICAL ENGINEERING BRANCH OFFICE OF NUCLEAR REACTOR REGULATION PALO ALTO, CA
AUGUST 7, 1981	DIVISION OF ENGINEERING TECHNOLOGY OFFICE OF NUCLEAR REGULATORY RESEARCH PALO ALTO, CA
OCTOBER 26, 1981	CHEMICAL ENGINEERING BRANCH OFFICE OF NUCLEAR REGULATORY RESEARCH PALO ALTO, CA

STEAM GENERATOR OWNERS GROUP

TOPICS COVERED

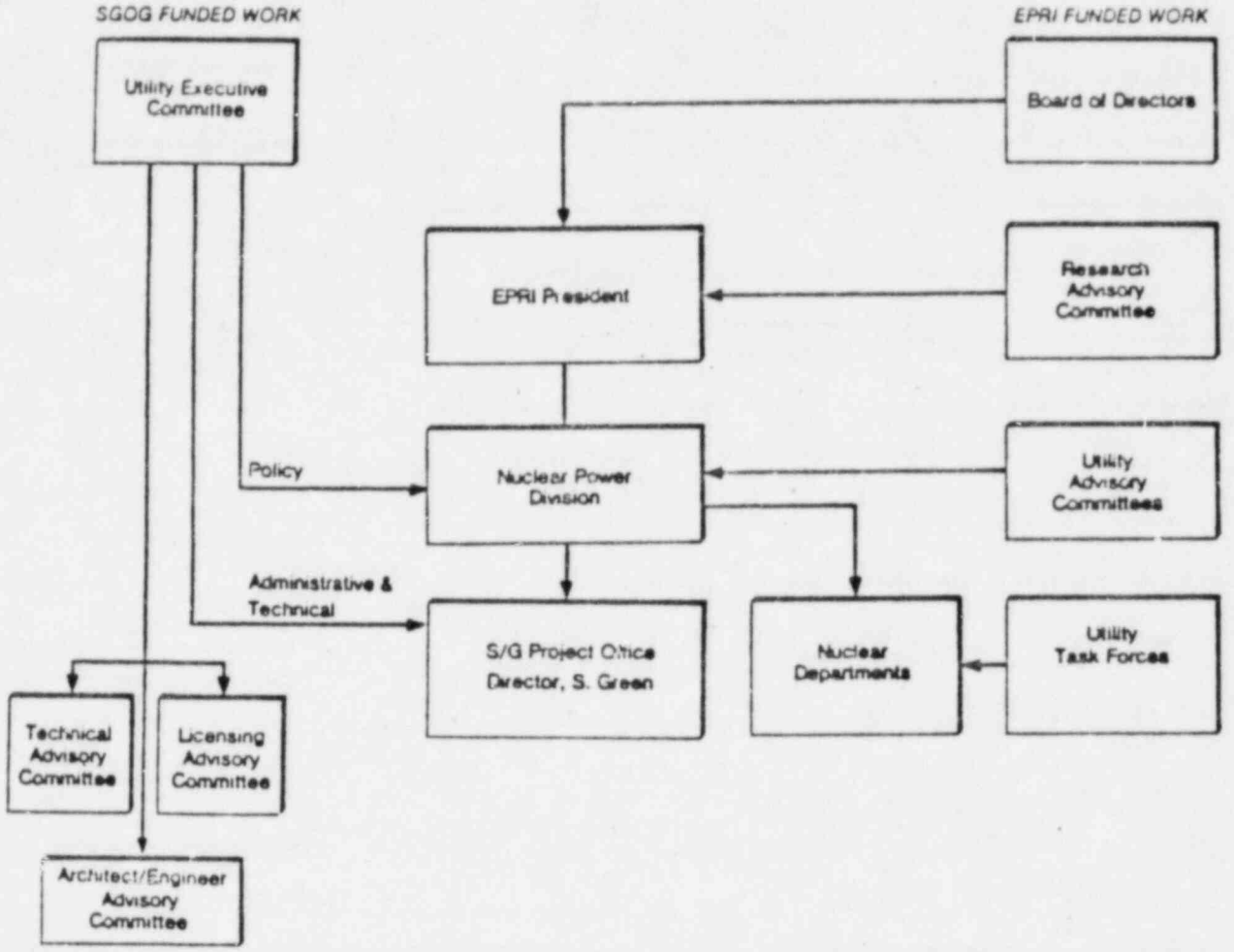
- ORGANIZATION AND PROGRAM
- RESULTS
- WORK UNDERWAY OR PLANNED
- SUMMARY

STEAM GENERATOR OWNERS GROUP

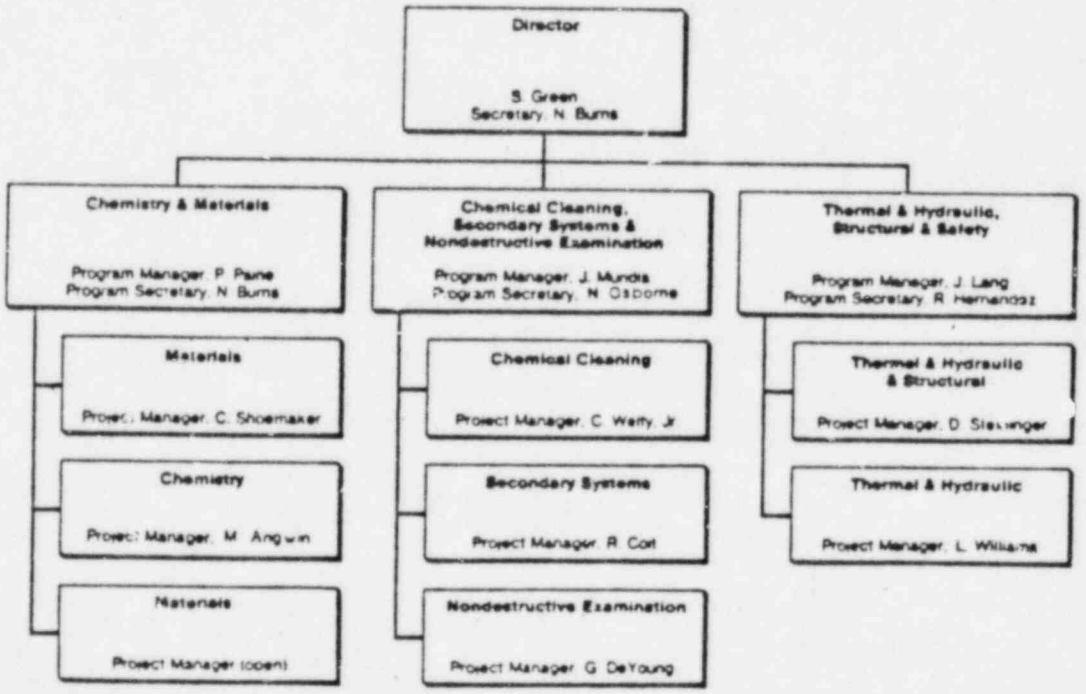
- MEMBERSHIP
  - 23 UTILITIES
    --16 OF 30 U.S. UTILITIES OPERATING PWRS
    --26 OF 47 U.S. OPERATING PWR UNITS
  - $36 MILLION COMMITMENT THROUGH 1982
- OBJECTIVE--PROVIDE TECHNOLOGY WHICH WILL IMPROVE STEAM GENERATOR RELIABILITY DURING THE LIFE OF THE POWER PLANT
- FOCUS--RESEARCH TO SOLVE PROBLEMS
  - TUBE DENTING
  - TUBE CORROSION
- PRODUCT--RECOMMENDATIONS AND GUIDELINES
- USERS--
  - UTILITIES
  - NSSS VENDORS
  - ARCHITECT/ENGINEERS
- PROGRAM MANAGEMENT
  - EPRI STEAM GENERATOR PROJECT OFFICE

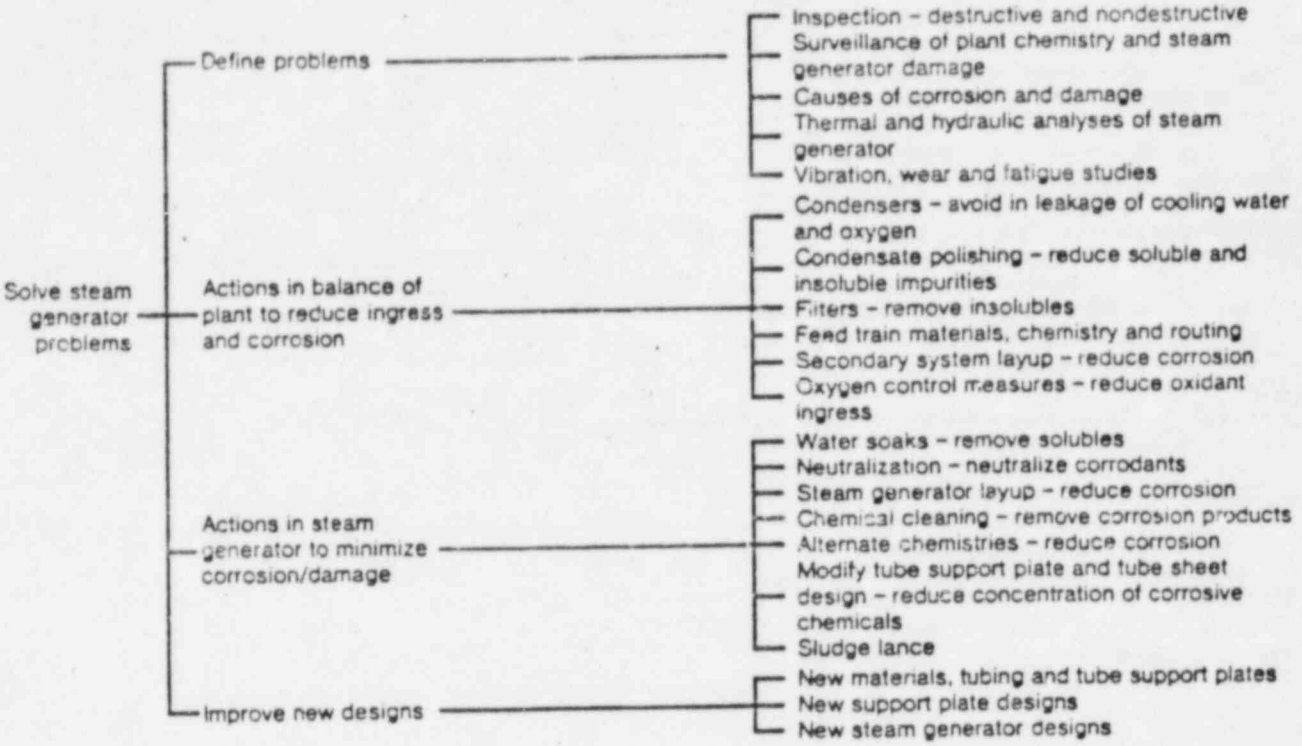
ORGANIZATION

JOINT STEAM GENERATOR OWNERS GROUP/EPRI ORGANIZATION



ELECTRIC POWER RESEARCH INSTITUTE
Steam Generator Project Office





Steam generator owners group program.

STEAM GENERATOR OWNERS GROUP
R&D BUDGET ($ X MILLIONS)
1977*-1982

	SGOG	EPRI	TOTAL
CHEMISTRY & MATERIALS	20.4	10.4	30.8
THERMAL & HYDRAULICS	14.3	4.7	19.0
NDE	3.2	1.0	4.2
TOTAL	37.9	16.1	54.0

* PRIOR TO 1977 EPRI WAS SPENDING $2 - 3 M/YEAR ON STEAM GENERATOR R&D.

STEAM GENERATOR OWNERS GROUP

CONTRACTS COMPLETED OR UNDERWAY	-	140
FINAL REPORTS ISSUED	-	53
WORKSHOP PROCEEDINGS ISSUED	-	4

STEAM GENERATOR OWNERS GROUP RESULTS

NONDESTRUCTIVE EXAMINATION TECHNOLOGY HAS BEEN ADVANCED

TECHNOLOGY	STATUS
TUBE/SUPPORT PLATE GAP CONDITION	
• VIBRATION PROBE	• AVAILABLE FOR FIELD USE
• FIBER OPTICS	• AVAILABLE FOR FIELD USE
SUPPORT PLATE INTEGRITY	
• RADIOGRAPHY	• AVAILABLE JUNE 1982
TUBE INTEGRITY	
• STRAIN GAGE PROFILOMETER	• USED IN FIELD; AVAILABLE AT NDE CENTER
• MULTIFREQUENCY EDDY CURRENT	• WIDELY USED IN INDUSTRY
• OPTICAL PROFILOMETER	• AVAILABLE JUNE 1982
TECHNOLOGY TRANSFER	
• NDE CENTER	• NDE EQUIPMENT • NDE ENGINEERS/TECHNICIANS • MOCKUP STEAM GENERATOR - SIMULATED DEFECTS

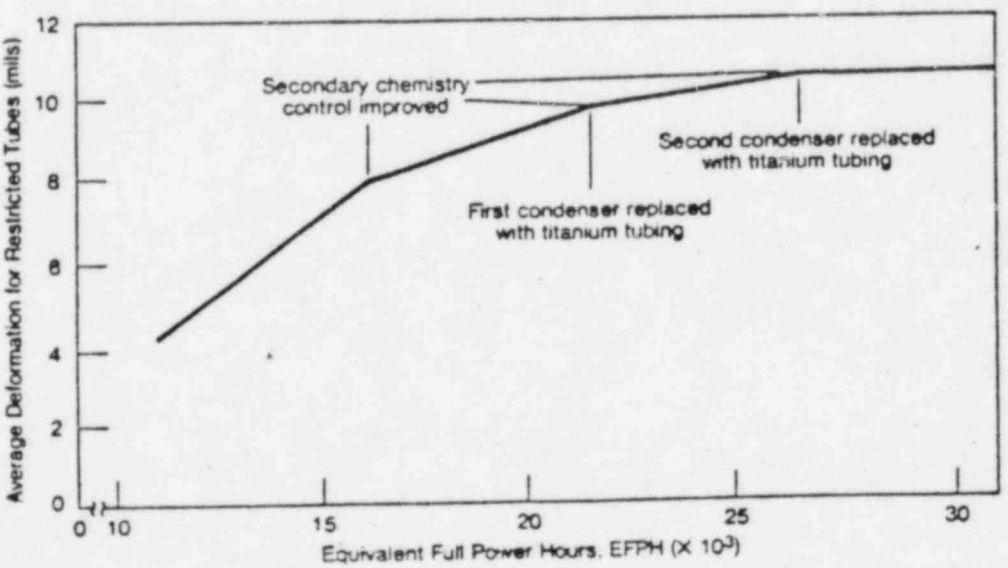
STEAM GENERATOR OWNERS GROUP RESULTS

CAUSES OF DENTING HAVE BEEN IDENTIFIED FROM LABORATORY AND PLANT DATA. PREVENTIVE AND CORRECTIVE ACTIONS ARE ALSO KNOWN.

- FEEDWATER AND OTHER PLANT DATA MONITORED AT ELEVEN RECIRCULATING AND SIX OTSG PLANTS
- MANY LABORATORY TESTS RUN TO SIMULATE DENTING AND DETERMINE EFFECT OF IMPURITIES
- CAUSES IDENTIFIED--IMPURITY INGRESS
  - CHLORIDES, OXIDANTS
- PREVENTION
  - EXCELLENT FEEDWATER QUALITY
    - —ISSUED SECONDARY WATER CHEMISTRY GUIDELINES TO MEMBERS
    - —DESCRIBED METHODS TO ACHIEVE QUALITY
    - —UTILITIES NOW DOING
  - REDUCE CONCENTRATION OF IMPURITIES IN THE CREVICE
- CORRECTION
  - FEEDWATER QUALITY
  - CHEMICAL CLEANING
  - NEUTRALIZATION

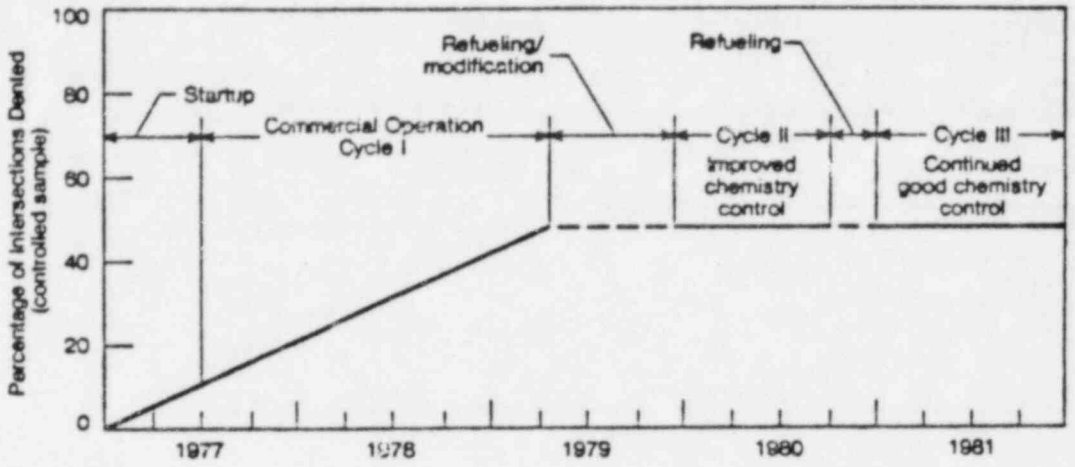
STEAM GENERATOR OWNERS GROUP RESULTS

IMPROVED CHEMISTRY CONTROL AT PLANT A HAS ARRESTED DENTING



STEAM GENERATOR OWNERS GROUP RESULTS

IMPROVED CHEMISTRY CONTROL AT PLANT B HAS ARRESTED DENTING



STEAM GENERATOR OWNERS GROUP RESULTS

PLANT DESIGN, OPERATION, AND MAINTENANCE IMPROVEMENTS WHICH ARRESTED DENTING
EXAMPLES FOR PLANT B

PLANT MODIFICATIONS

- Retubed Condenser With AL-6X
- Installed Full Flow Condensate Polishers
- Installed 1/3 Flow Feedwater Bypass (Startup) To Condenser
- Replaced Turbine To Condenser Expansion Joints

OPERATION AND MAINTENANCE IMPROVEMENTS

- Reduced Air and Cooling Water Leaks
- Sludge Lancing Each Refueling
- Increased Blowdown Flow
- Injecting Hydrazine Into Auxiliary Feed
- Improved Oxygen Monitoring Capability

STEAM GENERATOR OWNERS GROUP RESULTS

LABORATORY AND PLANT DATA SUPPORT USE OF NEUTRALIZERS TO ARREST DENTING

- DENTING ARRESTED IN MODEL BOILERS BY $Ca(OH)_2$ AND H_3BO_3 ADDITIONS WITH CONTINUED CONTAMINANT INGRESS.
- NO UNDESIRABLE SIDE EFFECTS OF NEUTRALIZER ADDITIONS IN MODEL BOILER TESTS.
- CORROSION RATE AT ONE UNIT APPEARS REDUCED BY A FACTOR OF 2.5 BASED ON ON-LINE HYDROGEN MONITORING WITH NO SIGNIFICANT IMPROVEMENT IN WATER CHEMISTRY CONTROL.
- CORROSION RATE GREATLY REDUCED BY COMBINATION OF NEUTRALIZATION AND IMPROVED WATER CHEMISTRY CONTROL AT ANOTHER UNIT.

STEAM GENERATOR OWNERS GROUP RESULTS

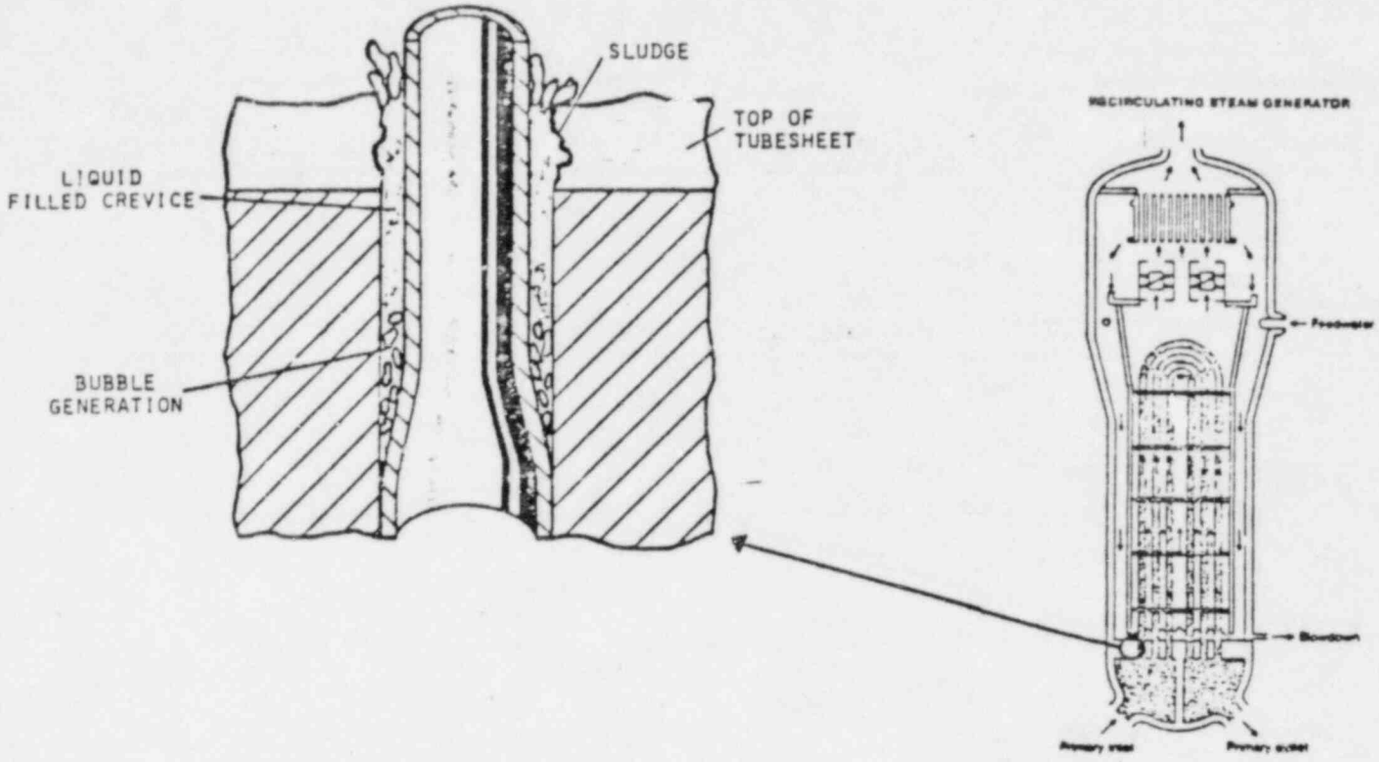
CHEMICAL CLEANING PROCESS: LABORATORY TEST RESULTS ARE ENCOURAGING

HIGH COPPER SLUDGE AND DENTED CREVICES CLEANED SUCCESSFULLY

- 81/85 INTERSECTIONS CLEANED
- GENERAL CORROSION ACCEPTABLE
- CORROSION (PITTING) OF SOME WELDED SPECIMENS TO BE RESOLVED
- PLANT-SPECIFIC CORROSION EVALUATION IS REQUIRED (AND BEING CONSIDERED)

STEAM GENERATOR OWNERS GROUP RESULTS

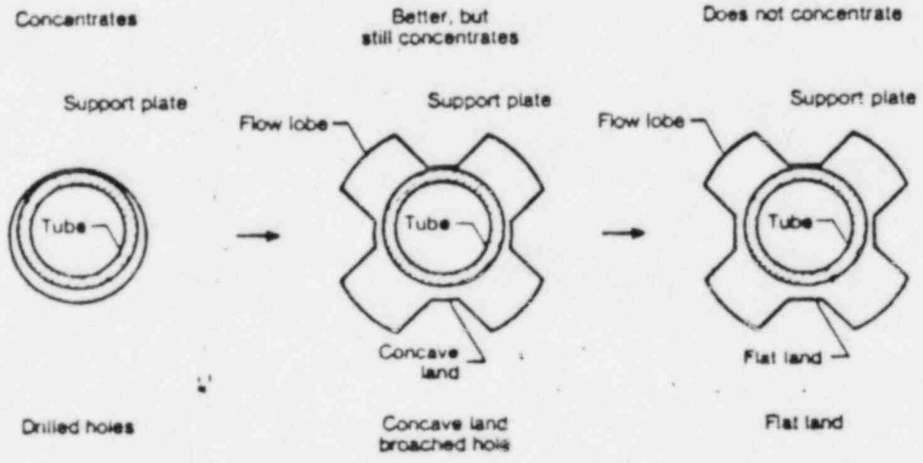
INTERGRANULAR ATTACK OF TUBES IN THE TUBESHEET HAS BEEN SLOWED BY A COMBINATION OF REDUCED PRIMARY TEMPERATURE AND TUBESHEET CREVICE FLUSHING BY DEPRESSURIZATION.



STEAM GENERATOR OWNERS GROUP RESULTS

IMPROVED TUBE SUPPORT PLATE DESIGNS WHICH DO NOT CONCENTRATE IMPURITIES ARE NOW IN USE.

EVOLUTION OF SUPPORT PLATE HOLE DESIGNS



MATERIALS FOR TUBE SUPPORT STRUCTURES HAVE BEEN CHANGED FROM CARBON STEEL TO FERRITIC STAINLESS STEEL WHICH IS MORE RESISTANT TO DENTING.

STEAM GENERATOR OWNERS GROUP RESULTS

MORE KNOWLEDGE OF THE DETAILED THERMAL AND HYDRAULIC BEHAVIOR OF STEAM GENERATORS IS NOW AVAILABLE FOR USE IN UNDERSTANDING CAUSES OF PROBLEMS AND IN IDENTIFYING FIXES.

- 3-D CODES
  - —CALCULATED FLOW VELOCITIES AND PATTERNS AND STEAM QUALITY DISTRIBUTION ARE PLAUSIBLE
  - —OUTPUT FROM SEVERAL CODES HAVE BEEN COMPARED, SENSITIVITY STUDIES HAVE BEEN PERFORMED, AND ERRORS HAVE BEEN CORRECTED
  - —DATA FROM EXPERIMENTAL MODELS AND INSTRUMENTED STEAM GENERATORS ARE BEING OBTAINED TO IMPROVE AND QUALIFY CODES
- CREVICE STUDIES
  - —TUBE SUPPORT GEOMETRIES WITH FLAT SURFACES IN CONTACT WITH TUBES ARE RESISTANT TO DRYOUT
  - —DEPRESSURIZATION FLUSHES ARE EFFECTIVE IN REMOVING CAUSTIC FROM TUBE-TO-TUBESHEET CREVICES
- SLUDGE STUDIES
  - —TUBE WASTAGE CORRELATES WITH DRYOUT IN SLUDGE
- STEAM SEPARATORS
  - —STATE OF THE ART SURVEYED
  - —CODE TO PREDICT DESIGN TRENDS

STEAM GENERATOR OWNERS GROUP RESULTS

GUIDELINES HAVE BEEN ISSUED OR ARE IN PREPARATION FOR IMPROVING OPERATIONS, MAINTENANCE AND DESIGNS.

GUIDELINES

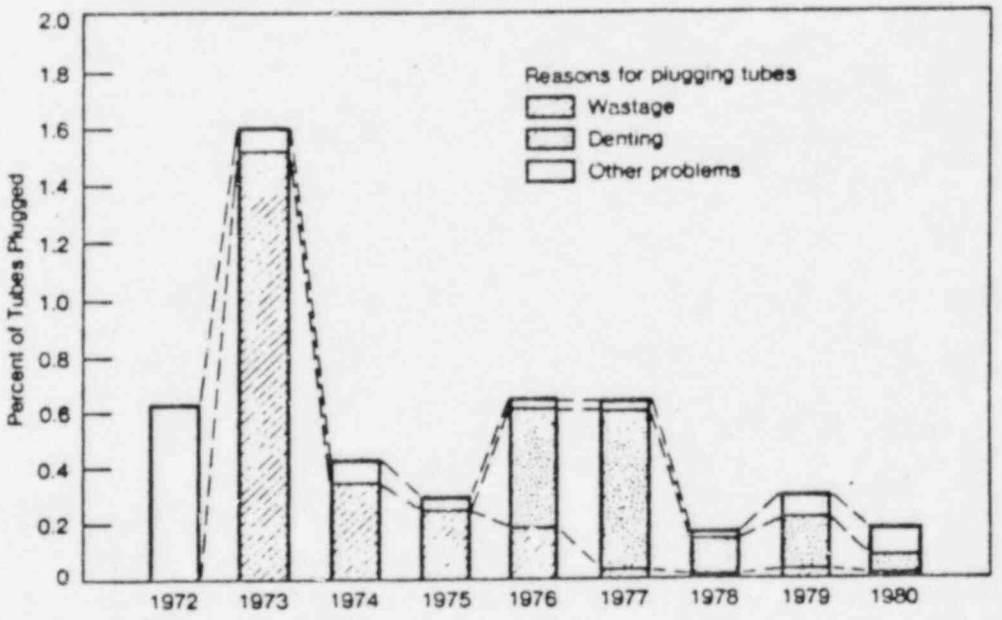
- SECONDARY WATER CHEMISTRY
- PREOPERATIONAL CLEANING
- STEAM GENERATOR CLEANLINESS DURING CONSTRUCTION
- BLOWDOWN SYSTEMS DESIGN
- DESIGN FOR STEAM GENERATOR REPLACEABILITY
- PLANT DESIGN FOR NDE
- DESIGN FOR LAYUP
- CONDENSER DESIGN/OPERATION

STEAM GENERATOR OWNERS GROUP

ACCOMPLISHMENTS

- DENTING MORE UNDER CONTROL
- OPERATORS MORE RESPONSIVE TO OFF-NORMAL CONDITIONS
- NEW DESIGNS REFLECT PROGRAM RESULTS
- NONDESTRUCTIVE EXAMINATION IMPROVED
- MANY HARDWARE CHANGES HAVE BEEN MADE

THE IMPACT OF DENTING HAS DECREASED AND THE EFFECT OF OTHER PROBLEMS HAS NOT BEEN AS SEVERE.



STEAM GENERATOR OWNERS GROUP

OTHER BENEFITS

- VENDORS MORE RESPONSIVE TO PROBLEMS
- ARCHITECT/ENGINEERS ARE PARTICIPATING
- UTILITIES EXCHANGING MEANINGFUL EXPERIENCES
- FORUM ESTABLISHED FOR TECHNOLOGY TRANSFER
- STRUCTURE ESTABLISHED TO DEAL WITH NEW PROBLEMS

UTILITY INDUSTRY IS ORGANIZING TO CONTINUE STEAM GENERATOR WORK

- ORGANIZATIONAL MEETING OF NEW OWNERS GROUP, TO ADDRESS CURRENT PROBLEMS, HELD IN JANUARY 1982
- 41 UTILITIES ATTENDED
  - 27 INDICATED INTENTION TO PARTICIPATE
  - 11 INDICATED PROBABLY
  - 2 INDICATED UNLIKELY
  - 1 SAID NO
- SCHEDULED MEETINGS
  - PROGRAM PLANNING--MAY 1982
  - MEMBER REPRESENTATIVES--JULY 1982
- TENTATIVE PROGRAM--$22-27 MILLION, 1983-1986

WORK IS UNDERWAY OR PLANNED TO ADDRESS CURRENT STEAM GENERATOR ISSUES

- INTERGRANULAR ATTACK AND STRESS CORROSION CRACKING IN SECONDARY WATER
- STRESS CORROSION CRACKING IN PRIMARY WATER
- PITTING
- MECHANICAL DAMAGE

INVOLVEMENT AND QUICK RESPONSE TO PLANT OCCURRENCES AND TUBE PULLS HELP KEEP RESEARCH RELEVANT (E.G., TMI, GINNA, INDIAN POINT 3, POINT BEACH).

INTERGRANULAR ATTACK AND STRESS CORROSION CRACKING IN SECONDARY WATER

CD INITIATED IGA AND SCC HAS OCCURRED IN STEAM GENERATOR TUBING AT MORE THAN 18 U.S. AND FOREIGN UNITS.

HAS OCCURRED IN TUBE-TO-TUBESHEET CREVICE AT 12 UNITS, AT TUBESHEET SECONDARY FACE OR IN SLUDGE PILE AT 11 UNITS, AND AT OTHER LOCATIONS IN THE TUBE BUNDLE AT 4 UNITS.

RESULTS ACHIEVED

- —LABORATORY TESTS CONFIRM THAT IGA AND SCC CAN BE CAUSED BY SEVERAL CHEMICAL ENVIRONMENTS
- —CAUSTIC ALONE AT HIGH CONCENTRATIONS
- —ACIDIC SULFATES AND/OR ION EXCHANGE RESINS
- —ALKALINE CARBONATES
- —ALKALINE SULFATES OR PHOSPHATES

PROGRAMS UNDERWAY

- —PRODUCTION OF IGA AND SCC IN PROTOTYPICAL MODEL BOILER TESTS WITH FULL DEPTH ISOTHERMAL TUBESHEETS
- —SCREENING OF VARIOUS POTENTIAL CORROSIVE SPECIES
- —TESTING FLUSHING AND SOAKING PROCEDURES

PROGRAMS PLANNED

- —DETERMINE MECHANISMS OF GRAIN BOUNDARY ATTACK
- —DETERMINE TEMPERATURE DEPENDENCE OF IGA
- —DEVELOP AND QUALIFY REMEDIAL MEASURES
- —PRODUCE SAMPLES FOR NDE METHODS QUALIFICATION

STRESS CORROSION CRACKING IN PRIMARY WATER

I.D. INITIATED CRACKING HAS OCCURRED IN TUBE U-BENDS OF STEAM GENERATORS IN 10 U.S. UNITS AND 7 FOREIGN UNITS.

I.D. INITIATED CRACKING HAS OCCURRED AT EXPANSION TRANSITION OF TUBES IN STEAM GENERATORS AT 5 FOREIGN UNITS.

RESULTS ACHIEVED

- —CRACKS IN U-BENDS OCCUR FIRST IN TIGHTEST RADIUS U-BENDS WHERE THERE IS EXCESSIVE OVALITY (E.G., AT APEX DUE TO DENTING) OR A DISCONTINUITY AT THE BEND TO STRAIGHT TRANSITION.
- —CALCULATIONS INDICATE DISCONTINUITIES CAUSE HIGH TENSILE STRESSES AT LOCATIONS OF CRACKS.

PROGRAMS UNDERWAY

- —DOCUMENT EXAMINATION OF CRACKED TUBE SAMPLES
- —COMPLETE STRESS ANALYSIS OF U-BENDS
- —EVALUATE METHODS TO RELIEVE OR REDISTRIBUTE STRESS IN U-BENDS AND EXPANSION TRANSITIONS
- —EDDY CURRENT INSPECTION TECHNIQUES TO DEFINE SUSCEPTIBLE TUBES

PROGRAMS PLANNED

- —DEFINE SET OF SUSCEPTIBLE TUBES
- —EVALUATE REMEDIAL ACTIONS
- —DETERMINE MECHANISMS AND VERIFY REMEDIAL ACTIONS

PITTING

EXTENSIVE TUBE PITTING HAS BEEN OBSERVED AT TWO UNITS

RESULTS ACHIEVED

- —FAILURE ANALYSIS OF TUBES SUGGESTS ACIDIC CHLORIDE ENVIRONMENTS WITH PRESENCE OF OXIDIZING SPECIES ARE REQUIRED TO INITIATE AND PROPAGATE PITTING.

PROGRAMS UNDERWAY

- —LABORATORY TESTING TO DETERMINE CONDITIONS AT WHICH PITTING OCCURS UNDER LAYUP CONDITIONS

PROGRAMS PLANNED

- —DEMONSTRATE PRODUCTION OF PITS UNDER PROTOTYPICAL CONDITIONS
- —DETERMINE FACTORS INVOLVED IN PIT INITIATION AND PROPAGATION
- —DEVELOP AND QUALIFY REMEDIAL ACTIONS

MECHANICAL DAMAGE

OD INITIATED CRACKS CONTINUE TO OCCUR IN TUBES NEAR THE UPPER TUBESHEET OF OTSGs IN AT LEAST 5 U.S. UNITS.

IMPINGEMENT-LIKE TUBE DAMAGE CONTINUES TO OCCUR IN TUBES IN OTSGs IN 1 U.S. UNIT.

TUBE WEAR HAS OCCURRED AT SUPPORT INTERSECTIONS IN PREHEATERS OF NEW STEAM GENERATORS IN 1 U.S. AND 2 FOREIGN UNITS.

RESULTS ACHIEVED

—LOW LEVEL OF TUBE VIBRATION MEASURED IN OTSGs PLUS CORROSION FATIGUE IS MOST LIKELY CAUSE OF TUBE CRACKS
—DEBRIS FOUND NEAR IMPINGEMENT-LIKE TUBE DAMAGE IS MAGNETITE

PROGRAMS UNDERWAY

—MEASURE HIGH CYCLE FATIGUE PERFORMANCE OF INCONEL TUBES IN AGGRESSIVE ENVIRONMENTS
—MEASURE TUBE VIBRATION IN AIR-WATER AND STEAM-WATER FLOWS
—MEASURE TUBE FRETTING AND WEAR OF VIBRATING TUBES IN VARIOUS SUPPORT GEOMETRIES

PROGRAMS PLANNED

—PREPARE AND QUALIFY ANALYTICAL MODEL FOR TUBE VIBRATION IN PREHEAT STEAM GENERATORS
—ESTABLISH CRITERIA FOR PREVENTING AND CORRECTING FLOW INDUCED VIBRATION BASED ON EXPERIMENTAL DATA, FIELD DATA, AND ANALYSIS
—MONITOR EFFECTIVENESS OF ACTION TO REMOVE DEBRIS FROM OTSG WITH IMPINGEMENT-LIKE TUBE DAMAGE

STEAM GENERATOR OWNERS GROUP SUMMARY

- EFFECTIVE INDUSTRY STRUCTURE ESTABLISHED TO DEAL WITH PROBLEMS
- DENTING IS MORE UNDER CONTROL
- INDUSTRY IS MORE SENSITIVE AND RESPONSIVE TO PROBLEMS
  - UTILITY
  - VENDOR
  - ARCHITECT ENGINEER
- PROGRESS HAS BEEN MADE
- ADDITIONAL WORK PLANNED USING EXISTING STRUCTURE

LAW OFFICES OF

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212-530- 7534

FREEDOM OF INFORMATION ACT REQUEST
FOIA-82-309
Rec'd 7-15-82

Director, Office of Administration
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Gentlemen:

This is a request under the Freedom of Information Act, as amended, 5 U.S.C. § 552 and the Freedom of Information Act Regulations of the United States Nuclear Regulatory Commission. 10 CFR Part 9.

The undersigned hereby requests:

A. All records (as that term is defined in 10 CFR § 9.3a) provided to NRC by Westinghouse Electric Corporation ("WEC") which refer or relate to the Indian Point Power Plant, Unit Number 2, ("IP2").

B. All records provided to NRC by WEC which refer or relate to tube degradation, denting, corrosion, cracking and/or related phenomena in any steam generator sold or manufactured by WEC for any nuclear power plant other than IP2 including, without limitation, WEC analyses of the causes of tube degradation and suggested or proposed remedial action.

C. All records provided to NRC by any person other than WEC which refer or relate to tube degradation, denting, corrosion, cracking and/or related phenomena in any steam generator sold or manufactured by WEC for any nuclear power plant.

D. All records authored, sponsored or commissioned by NRC and/or its employees which refer or relate to tube

degradation, denting, corrosion, cracking and/or related phenomena in any steam generator sold or manufactured by WEC for any nuclear power plant including, without limitation, analyses of the causes of said tube degradation and suggested or proposed remedial action.

E. All records authored, sponsored or commissioned by NRC and/or its employees which refer or relate to tube degradation, denting, corrosion, cracking and/or related phenomena in any steam generator sold or manufactured for any domestic nuclear power plant including, without limitation, analyses of the causes of said tube degradation and suggested or proposed remedial action.

F. All records provided to NRC by WEC which refer or relate to cracks in rotating components known as discs of steam turbines sold or manufactured by WEC for a nuclear power plant other than IP2 including without limitation, WEC analyses of the causes of such cracking and suggested or proposed remedial action.

G. All records provided to NRC by any person other than WEC which refer or relate to cracks in steam turbine discs sold or manufactured by WEC for a nuclear power plant.

H. All records authored, sponsored or commissioned by NRC and/or its employees which refer or relate to cracks in steam turbine discs sold or manufactured by WEC for any nuclear power plant including, without limitation, analyses of the causes of such cracking and suggested or proposed remedial action.

I note that it is the policy of NRC to disclose records which NRC might consider exempt from disclosure if such disclosure is not contrary to the public interest and will not adversely affect the rights of any person. 10 CFR § 9.9. Accordingly, for any record for which NRC claims an exemption would you specify not only your basis for claiming the exemption but also the reasons why this policy is not applicable.

As provided in the amended Act and 10 CFR

§§ 9.8 and 9.9, I will expect to receive a reply to this request within ten working days of your receipt of this letter. Costs not to exceed $500.00 are acceptable and will be paid. Should estimated costs of production exceed that sum, please advise me prior to commencing production.

Yours truly,

David J. Long