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Office of Nuclear Reactor Regulation, Director

SUBJECT: Forwards updated questionnaire response for steam generator info sys per NRC 771209 request.

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JOHN E. MAIER
VICE PRESIDENT

TELEPHONE
AREA CODE 716 546-2700

February 10, 1981

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

Dear Sir:

Enclosed herewith is our updating to your request of December 9, 1977 for questonnaire response for your steam generator information system.

Very truly yours,

John E. Maier

Enc.

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VI. TURBINE STOP VALVE TESTING (applicable to Babcock & Wilcox (B&W) S.G. only)

Frequency of Testing

Actual:

Manufacturer Recommendation:

Power Level At Which Testing Is Conducted

Actual:

Manufacturer Recommendation:

Testing Procedures (Stroke length, stroke rate, etc.)

Actual:

Manufacturer Recommendation:

VII. STEAM GENERATOR TUBE DEGRADATION HISTORY

(The following is to be repeated for each scheduled ISI)

Inservice Inspection (ISI) Date: 4/1-6/78

Number of EFP Days of Operation Since Last Inspection: 272.17

(The following is to be repeated for each steam generator)

Steam Generator Number: A/B Hot and Cold Legs

Percentage of Tubes Inspected At This ISI: 63%/52%

Percentage of Tubes Inspected At This ISI That Had Been Inspected At The Previous Scheduled ISI: 100%/100%

Percentage of Tubes Plugged Prior to This ISI: 3.6%/1.3%

Percentage of Tubes Plugged At This ISI: 1%/.48%

Percentage of Tubes Plugged That Did Not Exceed Degradation Limits: 0/0

Percentage of Tubes Plugged As A Result of Exceedance of Degradation Limits: 0/.46%

Sludge Layer Material Chemical Analysis Results:

Sludge Lancing (date): 4/1-6/78

Ave. Height of Sludge Before Lancing: 0-2"

Ave. Height of Sludge After Lancing: 0

Replacement, Retubing or Other Remedial Action Considered: (Briefly Specify Details) None

Support Plate Hourglassing: None

Support Plate Islanding: None

Tube Metalurgical Exam Results: None

Fretting or Vibration in U-Bend Area (not applicable to B&W S.G.) AS OF (4)

Percentage of Tubes Plugged	Other Preventive Measures
None. No problems of this nature	N/A

Wastage/Cavitation Erosion AS OF (4)

Hot Leg: (Repeat this information for the cold leg on Combustion Engineering (C.E.) and Westinghouse (W) S.G.)

A/B Hot and Cold Legs

Area of Tube Bundle (1)	a	b	c	d	e
% of Tubes Affected by Wastage/Cavitation Erosion					0/0
% of Tubes Plugged Due to Exceedance of Allowable Limit (2)				0/ 27	0/ .09
% of Tubes Plugged That Did not Exceed Degradation Limit					0/0
Location Above Tube Sheet (3)					½-3"/ ½-3"
Max. Wastage/Cavitation Erosion Rate for Any Single Tube (Tube Circum. Ave) (Mills/Month)					0/0
Max. Wastage/Cavitation Erosion in Any Single Unplugged Tube (Tube Circum. Ave) (Mills)					0/0

Cracking AS OF (4)

Caustic Stress Corrosion Induced in C.E. and W S.G.

Flow Induced Vibration Caused in B&W S.G.

Cracking (Con't)

Hot Leg: (Repeat this information for the cold leg on C.E. and W S.G.)

Area of Tube Bundle (1)	a	b	c	d	e
% of Tubes Affected By Cracking				0/27	0/.09%
% of Tubes Plugged Due to Cracking				0/27	0/.09%
% of Tubes Plugged That Did Not Exceed Degradation Limit					.036 /0
Location Above Tube Sheet (3)					½-3"/ ½-3"
Rate of Leakage From Leaking Cracks (gpm)					0/0

Denting (Not applicable to B&W S.G.) AS OF (4)

Hot Leg: (Repeat this information for the cold leg on C.E. and W S.G.)

Area of Tube Bundle (1)	a	b	c	d	e
% of Tubes Affected by Denting					6.25 /2.8
% of Tubes Plugged Due to Exceedance of Allowable Limit (2)					0/0
% of Tubes Plugged That Did Not Exceed Degradation Limit					0/0
Rate of Leakage From Leaking Dents (gpm)					0/0
Max. Denting Rate for Any Single Tube (Tube Circum. Ave) (Mills/Month)				approx 0/ approx 0	
Max. Denting in Any Single Unplugged Tube (Tube Circum. Ave) (Mills)					12/ 13

Denting (Con't)

Support Plate Levels	Max. Denting in Any Single Tube in Bundle Area (Tube Ave) (Mills) (1)					% of Tubes Affected By Denting in Bundle Area				
	a	b	c	d	e	a	b	c	d	e
1					10/10					2.8/2
2					6/6					3/2
3					3/0					.50/0
4					3/0					.26/0
5					10/3					8/0.1
6					10/3					16/4
7										
8										
9										
10										
11										
12										

TABLE KEY

NOTE: All percentages refer to the percent of the tubes within a given area of the tube bundle.

(1)

Area of the Tube Bundle	No. of Tubes Within the Area
a. Periphery of Bundle (wi/20rows for B&W; wi/10 rows for C.E. and W)	
b. Patch Plate (wi/4 rows)	
c. Missing Tube Lane (B&W only) (wi/5 rows)	
c. Flow Slot Areas (C.E. and W only) wi/10 rows)	
d. Wedge Regions (C.E. and W only) (wi/8 rows)	
e. Interior of Bundle (remainder of tubes)	

(2)

Allowable Limit for Wastage/Cavitation Erosion: 40%

Allowable Limit For Denting: None

(3)

1. Specifies area between the tube sheet and the first support plate

2. Specifies in the following locations: (list the additional locations)

   Wastage/Cavitation Erosion:

   Cracking:

(4)

Specify the date of the inspection for which results have been tabulated.

4/1-6/78

VI. TURBINE STOP VALVE TESTING (applicable to Babcock & Wilcox (B&W) S.G. only)

Frequency of Testing

Actual:

Manufacturer Recommendation:

Power Level At Which Testing Is Conducted

Actual:

Manufacturer Recommendation:

Testing Procedures (Stroke length, stroke rate, etc.)

Actual:

Manufacturer Recommendation:

VII. STEAM GENERATOR TUBE DEGRADATION HISTORY

(The following is to be repeated for each scheduled ISI)

Inservice Inspection (ISI) Date: 2/16-23/79

Number of EFP Days of Operation Since Last Inspection: 254.08

(The following is to be repeated for each steam generator)

Steam Generator Number: A/B Hot and Cold Legs

Percentage of Tubes Inspected At This ISI: 63%/52%

Percentage of Tubes Inspected At This ISI That Had Been Inspected At The Previous Scheduled ISI: 100%/100%

Percentage of Tubes Plugged Prior to This ISI: 3.7%/1.78%

Percentage of Tubes Plugged At This ISI: 0/.18%

Percentage of Tubes Plugged That Did Not Exceed Degradation Limits: 0/.03%

Percentage of Tubes Plugged As A Result of Exceedance of Degradation Limits: 0/.15%

Sludge Layer Material Chemical Analysis Results:

Sludge Lancing (date): 2/16-23/79

Ave. Height of Sludge Before Lancing: 0-2"

Ave. Height of Sludge After Lancing: 0"

Replacement, Retubing or Other Remedial Action Considered: (Briefly Specify Details) None

Support Plate Hourglassing: None

Support Plate Islanding: None

Tube Metalurgical Exam Results: None

Fretting or Vibration in U-Bend Area (not applicable to B&W S.G.) AS OF (4)

Percentage of Tubes Plugged	Other Preventive Measures
None. No problems of this nature.	N/A

Wastage/Cavitation Erosion AS OF (4)

Hot Leg: (Repeat this information for the cold leg on Combustion Engineering (C.E.) and Westinghouse (W) S.G.)

Area of Tube Bundle (1)	a	b	c	d	e
% of Tubes Affected by Wastage/Cavitation Erosion					
% of Tubes Plugged Due to Exceedance of Allowable Limit (2)					
% of Tubes Plugged That Did not Exceed Degradation Limit					
Location Above Tube Sheet (3)					
Max. Wastage/Cavitation Erosion Rate for Any Single Tube (Tube Circum. Ave) (Mills/Month)					
Max. Wastage/Cavitation Erosion in Any Single Unplugged Tube (Tube Circum. Ave) (Mills)					

Cracking AS OF (4)

Caustic Stress Corrosion Induced in C.E. and W S.G.

Flow Induced Vibration Caused in B&W S.G.

Cracking (Con't)

Hot Leg: (Repeat this information for the cold leg on C.E. and W S.G.)

Area of Tube Bundle (1)	a	b	c	d	e
% of Tubes Affected By Cracking				0/.12	0/.06
% of Tubes Plugged Due to Cracking				0/.12	0/.06
% of Tubes Plugged That Did Not Exceed Degradation Limit					0/.03
Location Above Tube Sheet (3)				0/ 0-½"	0/ At center of support plate 1 and 2 respectively
Rate of Leakage From Leaking Cracks (gpm)					0/0

Denting (Not applicable to B&W S.G.) AS OF (4)

Hot Leg: (Repeat this information for the cold leg on C.E. and W S.G.)

Area of Tube Bundle (1)	a	b	c	d	e
% of Tubes Affected by Denting					6.25 /2.8
% of Tubes Plugged Due to Exceedance of Allowable Limit (2)					0/0
% of Tubes Plugged That Did Not Exceed Degradation Limit					0/0
Rate of Leakage From Leaking Dents (gpm)					0/0
Max. Denting Rate for Any Single Tube (Tube Circum. Ave) (Mills/Month)				approx 0/ approx 0	
Max. Denting in Any Single Unplugged Tube (Tube Circum. Ave) (Mills)					12/13

Denting (Con't)

Support Plate Levels	Max. Denting in Any Single Tube in Bundle Area (Tube Ave) (Mills) (1)					% of Tubes Affected By Denting in Bundle Area				
	a	b	c	d	e	a	b	c	d	e
1					10/10					2.8/2
2					6/6					3/2
3					3/0					.50/0
4					3/0					.26/0
5					10/3					8/0.1
6					10/3					16/4
7										
8										
9										
10										
11										
12										

TABLE KEY

NOTE: All percentages refer to the percent of the tubes within a given area of the tube bundle.

(1)

Area of the Tube Bundle	No. of Tubes Within the Area
a. Periphery of Bundle (wi/20rows for B&W; wi/10 rows for C.E. and W)	
b. Patch Plate (wi/4 rows)	
c. Missing Tube Lane (B&W only) (wi/5 rows)	
c. Flow Slot Areas (C.E. and W only) wi/10 rows)	
d. Wedge Regions (C.E. and W only) (wi/8 rows)	
e. Interior of Bundle (remainder of tubes)	

(2)

Allowable Limit for Wastage/Cavitation Erosion: 40%

Allowable Limit For Denting: None

(3)

1. Specifies area between the tube sheet and the first support plate

2. Specifies in the following locations: (list the additional locations)

Wastage/Cavitation Erosion:

Cracking:

(4)

Specify the date of the inspection for which results have been tabulated.

VI. TURBINE STOP VALVE TESTING (applicable to Babcock & Wilcox (B&W) S.G. only)

Frequency of Testing

Actual:

Manufacturer Recommendation:

Power Level At Which Testing Is Conducted

Actual:

Manufacturer Recommendation:

Testing Procedures (Stroke length, stroke rate, etc.)

Actual:

Manufacturer Recommendation:

VII. STEAM GENERATOR TUBE DEGRADATION HISTORY

(The following is to be repeated for each scheduled ISI)

Inservice Inspection (ISI) Date: 4/1-9/80

Number of EFP Days of Operation Since Last Inspection: 303.13

(The following is to be repeated for each steam generator)

Steam Generator Number: A/B Hot and Cold Legs

Percentage of Tubes Inspected At This ISI: 100%/100%

Percentage of Tubes Inspected At This ISI That Had Been Inspected At The Previous Scheduled ISI: 100%/100%

Percentage of Tubes Plugged Prior to This ISI: 3.7%/1.96%

Percentage of Tubes Plugged At This ISI: .03%/1.04%

Percentage of Tubes Plugged That Did Not Exceed Degradation Limits: 0/.64%

Percentage of Tubes Plugged As A Result of Exceedance of Degradation Limits: .03/.39%

Sludge Layer Material Chemical Analysis Results:

Sludge Lancing (date): 4/1-9/80

Ave. Height of Sludge Before Lancing: 0-2"

Ave. Height of Sludge After Lancing: 0"

Replacement, Retubing or Other Remedial Action Considered: (Briefly Specify Details) None

Support Plate Hourglassing: None

Support Plate Islanding: None

Tube Metalurgical Exam Results: None

Fretting or Vibration in U-Bend Area (not applicable to B&W S.G.) AS OF (4)

Percentage of Tubes Plugged	Other Preventive Measures

Wastage/Cavitation Erosion AS OF (4)

Hot Leg: (Repeat this information for the cold leg on Combustion Engineering (C.E.) and Westinghouse (W) S.G.)

Area of Tube Bundle (1)	a	b	c	d	e
% of Tubes Affected by Wastage/Cavitation Erosion	*.03/ .06				*0/ .03
% of Tubes Plugged Due to Exceedance of Allowable Limit (2)	.03/ .06				0/ .03
% of Tubes Plugged That Did not Exceed Degradation Limit	0/ .03				
Location Above Tube Sheet (3)	2"/ 24"				0/ 2"
Max. Wastage/Cavitation Erosion Rate for Any Single Tube (Tube Circum. Ave) (Mills/Month)					0/0
Max. Wastage/Cavitation Erosion in Any Single Unplugged Tube (Tube Circum. Ave) (Mills)					0/0

*Small Volume Pit

Cracking AS OF (4)

Caustic Stress Corrosion Induced in C.E. and W S.G.

Flow Induced Vibration Caused in B&W S.G.

Cracking (Con't)

Hot Leg: (Repeat this information for the cold leg on C.E. and W S.G.)

Area of Tube Bundle (1)	a	b	c	d	e
% of Tubes Affected By Cracking	0/.06			0/.03	.03/.95
% of Tubes Plugged Due to Cracking	0/.06			0/.03	.03/.95
% of Tubes Plugged That Did Not Exceed Degradation Limit	0/.03				0/.61
Location Above Tube Sheet (3)	2"/24"			0/2"	0/10" to"18"
Rate of Leakage From Leaking Cracks (gpm)					0/0

Denting (Not applicable to B&W S.G.) AS OF (4)

Hot Leg: (Repeat this information for the cold leg on C.E. and W S.G.)

Area of Tube Bundle (1)	a	b	c	d	e
% of Tubes Affected by Denting					6.25/2.8
% of Tubes Plugged Due to Exceedance of Allowable Limit (2)					0/0
% of Tubes Plugged That Did Not Exceed Degradation Limit					0/0
Rate of Leakage From Leaking Dents (gpm)					0/0
Max. Denting Rate for Any Single Tube (Tube Circum. Ave) (Mills/Month)				approx 0/approx 0	
Max. Denting in Any Single Unplugged Tube (Tube Circum. Ave) (Mills)					12/13

Denting (Con't)

Support Plate Levels	Max. Denting in Any Single Tube in Bundle Area (Tube Ave) (Mills) (1)					% of Tubes Affected By Denting in Bundle Area				
	a	b	c	d	e	a	b	c	d	e
1					10/10					2.8/2
2					6/6					3/2
3					3/0					.50/0
4					3/0					.26/0
5					10/3					8/0.1
6					10/3					16/4
7										
8										
9										
10										
11										
12										

TABLE KEY

NOTE: All percentages refer to the percent of the tubes within a given area of the tube bundle.

(1)

Area of the Tube Bundle	No. of Tubes Within the Area
a. Periphery of Bundle (wi/20rows for B&W; wi/10 rows for C.E. and W)	
b. Patch Plate (wi/4 rows)	
c. Missing Tube Lane (B&W only) (wi/5 rows)	
c. Flow Slot Areas (C.E. and W only) wi/10 rows)	
d. Wedge Regions (C.E. and W only) (wi/8 rows)	
e. Interior of Bundle (remainder of tubes)	

(2)

Allowable Limit for Wastage/Cavitation Erosion: 40 %

Allowable Limit For Denting: NONE

(3)

1. Specifies area between the tube sheet and the first support plate

2. Specifies in the following locations: (list the additional locations)

   Wastage/Cavitation Erosion:

   Cracking:

(4)

Specify the date of the inspection for which results have been tabulated.

VI. TURBINE STOP VALVE TESTING (applicable to Babcock & Wilcox (B&W) S.G. only)

Frequency of Testing

Actual:

Manufacturer Recommendation:

Power Level At Which Testing Is Conducted

Actual:

Manufacturer Recommendation:

Testing Procedures (Stroke length, stroke rate, etc.)

Actual:

Manufacturer Recommendation:

VII. STEAM GENERATOR TUBE DEGRADATION HISTORY

(The following is to be repeated for each scheduled ISI)

Inservice Inspection (ISI) Date: 11/3-20/80

Number of EFP Days of Operation Since Last Inspection: 158.23

(The following is to be repeated for each steam generator)

Steam Generator Number: A/B Hot Legs Only

Percentage of Tubes Inspected At This ISI: 100%/100%

Percentage of Tubes Inspected At This ISI That Had Been Inspected At The Previous Scheduled ISI: 100%/100%

Percentage of Tubes Plugged Prior to This ISI: 3.73%/3%

Percentage of Tubes Plugged At This ISI: 0/0

Percentage of Tubes Plugged That Did Not Exceed Degradation Limits: 0/0

Percentage of Tubes Plugged As A Result of Exceedance of Degradation Limits: 0/0

Sludge Layer Material Chemical Analysis Results:

Sludge Lancing (date): 11/3-20/80

Ave. Height of Sludge Before Lancing: 0-2"

Ave. Height of Sludge After Lancing: 0"

Replacement, Retubing or Other Remedial Action Considered: (Briefly Specify Details) 5 Test Sleeves

Support Plate Hourglassing: None

Support Plate Islanding: None

Tube Metalurgical Exam Results: None

Fretting or Vibration in U-Bend Area (not applicable to B&W S.G.) AS OF (4)

Percentage of Tubes Plugged	Other Preventive Measures
None. No problems of this nature.	N/A

Wastage/Cavitation Erosion AS OF (4)

Hot Leg: (Repeat this information for the cold leg on Combustion Engineering (C.E.) and Westinghouse (W) S.G.)

Area of Tube Bundle (1)	a	b	c	d	e
% of Tubes Affected by Wastage/Cavitation Erosion					
% of Tubes Plugged Due to Exceedance of Allowable Limit (2)					
% of Tubes Plugged That Did not Exceed Degradation Limit					
Location Above Tube Sheet (3)					
Max. Wastage/Cavitation Erosion Rate for Any Single Tube (Tube Circum. Ave) (Mills/Month)					
Max. Wastage/Cavitation Erosion in Any Single Unplugged Tube (Tube Circum. Ave) (Mills)					

Cracking AS OF (4)

Caustic Stress Corrosion Induced in C.E. and W S.G.

Flow Induced Vibration Caused in B&W S.G.

Cracking (Con't)

Hot Leg: (Repeat this information for the cold leg on C.E. and W S.G.)

Area of Tube Bundle (1)	a	b	c	d	e
% of Tubes Affected By Cracking					0/.09
% of Tubes Plugged Due to Cracking					0/0
% of Tubes Plugged That Did Not Exceed Degradation Limit					0/0
Location Above Tube Sheet (3)					0/0
Rate of Leakage From Leaking Cracks (gpm)					0/0

Denting (Not applicable to B&W S.G.) AS OF (4)

Hot Leg: (Repeat this information for the cold leg on C.E. and W S.G.)

Area of Tube Bundle (1)	a	b	c	d	e
% of Tubes Affected by Denting					6.25/ 2.8
% of Tubes Plugged Due to Exceedance of Allowable Limit (2)					0/0
% of Tubes Plugged That Did Not Exceed Degradation Limit					0/0
Rate of Leakage From Leaking Dents (gpm)					0/0
Max. Denting Rate for Any Single Tube (Tube Circum. Ave) (Mills/Month)				approx 0/ approx 0	
Max. Denting in Any Single Unplugged Tube (Tube Circum. Ave) (Mills)					12/13

Denting (Con't)

Support Plate Levels	Max. Denting in Any Single Tube in Bundle Area (Tube Ave) (Mills) (1)					% of Tubes Affected By Denting in Bundle Area				
	a	b	c	d	e	a	b	c	d	e
1					10/10					2.8/2
2					6/6					3/2
3					3/0					.50/0
4					3/0					.26/0
5					10/3					8/0.1
6					10/3					16/4
7										
8										
9										
10										
11										
12										

TABLE KEY

NOTE: All percentages refer to the percent of the tubes within a given area of the tube bundle.

(1)

Area of the Tube Bundle	No. of Tubes Within the Area
a. Periphery of Bundle (wi/20rows for B&W; wi/10 rows for C.E. and W)	
b. Patch Plate (wi/4 rows)	
c. Missing Tube Lane (B&W only) (wi/5 rows)	
c. Flow Slot Areas (C.E. and W only) wi/10 rows)	
d. Wedge Regions (C.E. and W only) (wi/8 rows)	
e. Interior of Bundle (remainder of tubes)	

(2)

Allowable Limit for Wastage/Cavitation Erosion: 40 %

Allowable Limit For Denting: NONE

(3)

1. Specifies area between the tube sheet and the first support plate

2. Specifies in the following locations: (list the additional locations)

   Wastage/Cavitation Erosion:

   Cracking:

(4)

Specify the date of the inspection for which results have been tabulated.