REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)
DISTRIBUTION FOR INCOMING MATERIAL 50-289

REC: NRC
ORG: HERBEIN J G
METROPOL EDISON
DOCDATE: 02/13/78
DATE RCVD: 02/16/78

DOCTYPE: LETTER NOTARIZED: NO
SUBJECT:
FORWARDING COMPLETED QUETIONNAIRE CONCERNING STEAM GENERATOR OPERATING HISTORY.

COPIES RECEIVED
LTR 1 ENCL 1

PLANT NAME: THREE MILE ISLAND - UNIT 1

REVIEWER INITIAL: XJM
DISTRIBUTOR INITIAL:

********** DISTRIBUTION OF THIS MATERIAL IS AS FOLLOWS **********

RELIABILITY OF STANDBY DIESEL GENERATOR UNITS.
(DISTRIBUTION CODE A014)

FOR ACTION: BRANCH CHIEF REID**W/3 ENCL

INTERNAL: REG FILE**W/ENCL
I&E**W/2 ENCL
HANAUER**W/ENCL
F CLEMENSON**W/ENCL
NRC PDR**W/ENCL
OELD**W/ENCL
F ROSA**W/ENCL
DIS SER BR-MC**W/ENCL

EXTERNAL: LPDR'S
HARRISBURG, PA**W/ENCL
TIC**W/ENCL
NSIC**W/ENCL
ACRS CAT B**W/10 ENCL

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DISTRIBUTION: LTR 25 ENCL 25
SIZE: 1P+9P

CONTROL NBR: 780480249

********** THE END **********

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METROPOLITAN EDISON COMPANY

POST OFFICE BOX 542 READING, PENNSYLVANIA 19603 TELEPHONE 215 – 929-3601

February 13, 1978
GQL 0200

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

Dear Sir:

Three Mile Island Nuclear Station, Unit II (TMI-2)
Operating License No. DPR-50
Docket No. 50-289

Enclosed please find our completed questionnaire concerning steam generator operating history. Should you have any questions concerning this response, please contact R. O. Barley at Three Mile Island Nuclear Station.

Sincerely,

J. G. Herbein
Vice President-Generation

JGH:DGM:cjg

Enclosure

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7804802 49

A014/S *
1/1

ENCLOSURE 1

STEAM GENERATOR OPERATING

HISTORY QUESTIONNAIRE

NOTE: All percentages should be reported to four significant figures.

I. BASIC PLANT INFORMATION

Plant:	Three Mile Island - Unit 1
Startup Date:	2 September 1974
Utility:	Metropolitan Edison Company
Plant Location:	Middletown, Pennsylvania
Thermal Power Level:	2535 MWT
Nuclear Steam Supply System (NSSS) Supplier:	Babcock & Wilcox Co.
Number of Loops:	2
Steam Generator Supplier, Model No. and Type:	B&W, N/A, OTSG
Tube Size and Material:	0.625" O.D./0.034" wall/56' 2 3/8"/Inconel
Number of Tubes Per Generator:	15,531

II. STEAM GENERATOR OPERATING CONDITIONS

Normal Operation	Prim.	Sec.
Temperature:	602.8°F	570°F
Flow Rage:	$65.6 \times 10^6 \frac{LB}{HR}$	$5.3 \times 10^6 \frac{LB}{HR}$
Primary Pressure:	2200 psia	
Secondary Pressure:	925 psia	

Allowable Leakage Rate: $I^{131} \leq 1$ µCi/cc

Accidents

Design Base LOCA Max. Delta-P: 925 psia

Main Steam Line Break (MSLB) Max. Delta-P: 2200 psia

III. STEAM GENERATOR SUPPORT PLATE INFORMATION

Material:	Carbon Steel
Design Type:	Broached Opening
Design Code:	SA-212-B
Dimensions:	118 3/8" Diameter
Flow Rate:	$5.3 \times 10^6 \frac{LB}{HR}$
Tube Hole Dimensions:	≈0.320 in. min. radius/tube
Flow Hole Dimensions:	≈0.135 sq. in./tube

IV. STEAM GENERATOR BLOWDOWN INFORMATION

Frequency of Blowdown:	Not Required
Normal Blowdown Rate:	NA
Blowdown Rate w/Condenser Leakage:	NA
Chemical Analysis Results	NA

Results	Parameter Control Limits
NA	NA

V. WATER CHEMISTRY INFORMATION

Secondary Water

Type of Treatment and Effective Full Power (EFP) Months of Operation:
Ammonia and Hydrazine added to feed water - Powdex polishing 32 EFPM

Typical Chemistry or Impurity Limits:

Ammonia	2-20	ppm
Hydrazine	>50	ppm
Catalyzed Hydrazine	>25	ppm
pH @77°F	9.5-10.5	
Cation Conductivity	<10	µmho
Na	<1.0	ppm
Cl^-	<1.0	ppm

Feedwater

Typical Chemistry or Impurity Limits:

pH @77°F	9.3-9.5	
Max Solids	<50	ppb
Cation Conductivity	<5	µmho
Max. O_2	7	ppb
Max SiO_2	20	ppb
Max. Fe	10	ppb
Max. Cu	2	ppb

Condenser Cooling Water

Typical Chemistry or Impurity Limits:

1. Concentration controlled to 2-3x river water solids concentration by blowdown
2. Maintain 0-0.5 L'Angelier Index by adding sulfuric acid
3. Chlorination 0.4 ppm free Cl^- by adding for three 15-minute periods per day during warm months only

Demineralizers - Type: None

Cooling Tower (open cycle, closed cycle or none): Closed Cycle

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

Frequency of Testing

Actual: 1 per month

Manufacturer Recommendation: 1 per day

Power Level At Which Testing is Conducted

Actual: 50%

Manufacturer: Not specified

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

Actual: 100% stroke @ <1 min. full open to full close

Manufacturer Recommendation: Not specified

VII. STEAM GENERATOR TUBE DEGRADATION HISTORY

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

Inservice Inspection (ISI) Date:	3/76	3/77
Number of EFP Days of Operation Since Last Inspection:	Baseline	257

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

Note: There were 467 EFPD as of the 3/76 inspection.

Steam Generator Number:	A	B	A	B
Percentage of Tubes Inspected at This ISI:	3%	3%	6.3%	3.2%
Percentage of Tubes Inspected at This ISI That Had Been Inspected at the Previous Scheduled ISI:	-	-	3%	0.8%
Number of Tubes Plugged Prior to This ISI:	2	3	2	3
Number of Tubes Plugged at This ISI:	0	0	2	6
Percentage of Tubes Plugged That Did Not Exceed Degradation Limits:	-	-	50%	0
Percentage of Tubes Plugged as a Result of Exceedance of Degradation Limits:	-	-	50%	100%

Sludge Layer Material Chemical Analysis Results:	Not applicable
Sludge Lancing (date):	NA
Ave. Height of Sludge Before Lancing:	NA
Ave. Height of Sludge After Lancing:	NA
Replacement, Retubing or Other Remedial Action Considered: Briefly Specify Details	NA
Support Plate Hourglassing:	NA
Support Plate Islanding:	NA
Tube Metalurgical Exam Results:	NA

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

Percentage of Tubes Plugged	Other Preventive Measures
NA	

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	NOT APPLICABLE				
% 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)					

NA

Cracking AS OF (4)

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

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

Cracking (Con't)

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

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

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

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	NOT APPLICABLE				
% of Tubes Plugged Due to Exceedance of Allowable Limit (2)					
% of Tubes Plugged That Did Not Exceed Degradation Limit					
Rate of Leakage From Leaking Dents (gpm)					
Max. Denting Rate for Any Single Tube (Tube Circum. Ave) (Mills/Month)					
Max. Denting in Any Single Unplugged Tube (Tube Circum. Ave) (Mills)					

Denting (Con't) NA

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
		NOT APPLICABLE								
1										
2										
3										
4										
5										
6										
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)	~6870
b. Patch Plate (wi/4 rows)	NA
c. Missing Tube Lane (B&W only) (wi/5 rows)	~770 (including 200 from part A)
c. Flow Slot Areas (C.E. and W only) wi/10 rows)	NA
d. Wedge Regions (C.E. and W only) (wi/8 rows)	NA
e. Interior of Bundle (remainder of tubes)	~8090

(2)

Allowable Limit for Wastage/Cavitation Erosion: 40%

Allowable Limit For Denting: Not Applicable

(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: NA

Cracking. NA

(4)

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

VIII. SIGNIFICANT STEAM GENERATOR ABNORMAL OPERATIONAL EVENTS

DATE	SUMMARY	
	(Include event description; unscheduled ISI results; if performed; and subsequent remedial actions)	
Date	Event	OTSG
1. HFT*	11 cycles on EF nozzles	A & B
2. 12/76	1 hr. @ 500°F with FW<90°F	A & B
3. 12/76	½ hr. @ 520°F with FW<90°F	A
4. 11/77	6½ hr. @ 532°F with FW<90°F	A & B
5. 10/77	3.6 pH for about 3 hours (secondary)	A & B
6. HFT	OTSG Level<97% RC>300°F Numerous cycles	A & B

IX. CONDENSER INFORMATION

Condenser Material	Tube Leakage Date	Rate (gpm)	Detectable Limit	Detection Method
304 SS	HFT*	160 gpm	0.1-0.2 gpm	Cat. Cond.: High
	6-9/76	0.4-1.5	0.1-0.2 gpm	Sodium: High
				Powdex Performance

X. RADIATION EXPOSURE HISTORY WITH RESPECT TO STEAM GENERATORS

Date	Exam Dosage (Man-Rem)	Repair Dosage (Man-Rem)	Comments
76	Data not available	NA	
77	12.834 Man-Rem	9.467 Man-Rem	

*HFT = Hot Functional Testing Period

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XI. DEGRADATION HISTORY FOR EACH TYPE OF DEGRADATION EXPERIENCED FOR TEN REPRESENTATIVE, UNPLUGGED TUBES FOR WHICH THE RESULTS OF TWO OR MORE ISI'S ARE AVAILABLE

If the results for ten tubes are not available, specify this information for all those tubes for which results are available. NA

(repeat the following information for each tube and degradation type)

Steam Generator No:
Tube Identification: NOT APPLICABLE
Type of Degradation: (specify denting, wastage, cavitation erosion, caustic stress corrosion cracking, or flow induced vibration cracking)

(repeat the following information chronologically for each ISI for which results are available)

ISI Date:
Amount of Degradation: (specify amount and units)
EFP Months of Operation Since Last ISI for Which Results are Given: