

Public Service
Electric and Gas
Company

Corbin A. McNeill, Jr.
Vice President-
Nuclear

Public Service Electric and Gas Company P.O. Box 236, Hancocks Bridge, NJ 08038 609 339-4800

NLR-N86082

July 7, 1986

Director of Nuclear Reactor Regulation
United States Nuclear Regulatory Commission
7920 Norfolk Avenue
Bethesda, Maryland 20814

Attention: Ms. Elinor Adensam, Director
Project Directorate #3
Division of BWR Licensing

Dear Ms. Adensam:

TURBINE SYSTEM MAINTENANCE PROGRAM (LICENSE CONDITION 3)
HOPE CREEK GENERATING STATION
DOCKET NO. 50-354

License Condition 3 of Facility Operating License NPF-50 requires Public Service Electric and Gas Company (PSE&G) to submit a turbine system maintenance program based on the manufacturer's calculations of missile generation probabilities.

General Electric Company, the manufacturer of the Hope Creek turbine, has completed a probabilistic evaluation of the low pressure turbines at Hope Creek. Based on the attached results and recommendations from General Electric, which are based upon the methodology of GE report, "Probability of Missile Generation in General Electric Nuclear Turbines" dated January 1984, PSE&G will inspect the low pressure turbine rotors for the unit over a six year interval during scheduled refueling outages. The revised description of the turbine in-service inspection program is attached (FSAR Section 10.2.3.6) and will be included in the next update to the FSAR.

In accordance with 10 CFR 170.21, attached is a check for \$150.00.

This submittal satisfies the provisions of License Condition (3) and PSE&G requests that the condition be removed at the time that the full-power license is issued for Hope Creek Generating Station.

Sincerely,

C A McNeill Jr / JTB
Rec'd w/ check
A001
11

8607090301 860707
PDR ADOCK 05000354
P PDR

Director of Nuclear
Reactor Regulation

2

C Mr. D. H. Wagner
USNRC Licensing Project Manager

Mr. R. W. Borchardt
USNRC Senior Resident Inspector

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HOPE CREEK

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UTILITY: PUBLIC SERVICE ELECTRIC & GAS

STATION: HOPE CREEK 41

AL ID./ROTOR: 170X550 - LPA

REVISION 2

UTILITY PREPARING

TABLE 1
SUMMARY OF MISSILE PROBABILITIES

05/20/85

WHEEL ID	LAST INSP	TIME MEASURED FROM LAST ROTOR INSPECTION									
		0. YRS	0.5 YRS	1.0 YRS	1.5 YRS	2.0 YRS	2.5 YRS	3.0 YRS	4.0 YRS	5.0 YRS	6.0 YRS
1GA	0.	6.4E-10	6.4E-10	6.4E-10	6.4E-10	6.4E-10	6.4E-10	6.4E-10	6.4E-10	6.5E-10	7.0E-10
1TA	0.	9.4E-10	9.4E-10	9.4E-10	9.4E-10	9.4E-10	9.4E-10	9.4E-10	9.4E-10	9.4E-10	9.8E-10
2GA	0.	1.0E-09	1.0E-09	1.0E-09	1.0E-09	1.0E-09	1.0E-09	1.0E-09	1.0E-09	1.0E-09	1.1E-09
2TA	0.	1.1E-09	1.1E-09	1.1E-09	1.1E-09	1.1E-09	1.1E-09	1.1E-09	1.1E-09	1.1E-09	1.2E-09
3GA	0.	2.5E-09	2.5E-09	2.5E-09	2.5E-09	2.5E-09	2.5E-09	2.5E-09	2.6E-09	3.2E-09	5.4E-09
3TA	0.	1.3E-09	1.3E-09	1.3E-09	1.3E-09	1.3E-09	1.3E-09	1.4E-09	1.5E-09	2.2E-09	5.0E-09
4GA	0.	6.4E-10	6.4E-10	6.4E-10	6.4E-10	6.4E-10	6.5E-10	6.8E-10	9.7E-10	2.2E-09	6.5E-09
4TA	0.	7.4E-10	7.4E-10	7.4E-10	7.4E-10	7.5E-10	7.5E-10	7.6E-10	1.0E-09	2.1E-09	5.7E-09
5GA	0.	6.3E-09	6.3E-09	6.3E-09	6.3E-09	6.5E-09	7.1E-09	8.8E-09	2.1E-08	7.1E-08	2.4E-07
5TA	0.	9.5E-09	9.5E-09	9.5E-09	9.5E-09	9.5E-09	9.5E-09	9.5E-09	9.8E-09	1.1E-08	1.8E-08
6GA	0.	8.3E-09	8.3E-09	8.3E-09	8.3E-09	8.3E-09	8.4E-09	8.5E-09	1.0E-08	1.4E-08	2.8E-08
6TA	0.	9.8E-09	9.8E-09	9.8E-09	9.8E-09	9.8E-09	9.9E-09	9.9E-09	1.1E-08	1.3E-08	2.1E-08
7GA	0.	6.0E-09	8.0E-09	8.0E-09	8.0E-09	8.0E-09	8.0E-09	8.0E-09	8.0E-09	8.0E-09	8.0E-09
7TA	0.	1.0E-08	1.0E-08	1.0E-08	1.0E-08	1.0E-08	1.0E-08	1.0E-08	1.0E-08	1.0E-08	1.0E-08
LPA	0.	6.1E-08	6.1E-08	6.1E-08	6.1E-08	6.1E-08	6.2E-08	6.4E-08	8.0E-08	1.4E-07	3.5E-07
UNIT	0.	1.8E-07	1.8E-07	1.8E-07	1.8E-07	1.9E-07	1.9E-07	1.9E-07	2.5E-07	4.5E-07	1.1E-06

- NOTE: 1. '1TA' WHEEL IDENTIFICATION REFERS TO FIRST TURBINE END WHEEL OF LP 'A' ROTOR
 2. 'LAST INSP' REFERS TO TOTAL SERVICE TIME (YEARS) ACCUMULATED TO LAST INSPECTION
 3. ALL PROBABILITIES EXPRESSED ON AN ANNUAL BASIS ('2.3E-03' IS EQUIVALENT TO 0.0023)

SUMMARY OF BURST PROBABILITIES

EQUIPMENT: 170X558 - LPA

WHEEL ID LAST INSP ADDITIONAL SERVICE TIME MEASURED FROM LAST ROTOR INSPECTION

		0. YRS	0.5 YRS	1.0 YRS	1.5 YRS	2.0 YRS	2.5 YRS	3.0 YRS	4.0 YRS	5.0 YRS	6.0 YRS
1GA	0.	6.4E-10	6.4E-10	6.4E-10	6.4E-10	6.4E-10	6.4E-10	6.4E-10	7.1E-10	1.2E-09	3.6E-09
1TA	0.	9.4E-10	9.4E-10	9.4E-10	9.4E-10	9.4E-10	9.4E-10	9.4E-10	9.8E-10	1.3E-09	2.7E-09
2GA	0.	2.0E-09	2.0E-09	2.0E-09	2.0E-09	2.0E-09	2.0E-09	2.0E-09	2.3E-09	4.5E-09	1.5E-08
2TA	0.	2.1E-09	2.1E-09	2.1E-09	2.1E-09	2.1E-09	2.1E-09	2.1E-09	2.7E-09	6.5E-09	2.4E-08
3GA	0.	3.6E-09	3.6E-09	3.6E-09	3.6E-09	3.6E-09	3.7E-09	4.2E-09	1.0E-08	4.1E-08	1.6E-07
3TA	0.	1.9E-09	1.9E-09	1.9E-09	1.9E-09	1.9E-09	2.1E-09	2.7E-09	1.0E-08	4.9E-08	2.0E-07
4GA	0.	2.0E-09	2.0E-09	2.0E-09	2.0E-09	2.3E-09	3.5E-09	7.9E-09	5.5E-08	2.5E-07	9.3E-07
4TA	0.	2.3E-09	2.3E-09	2.3E-09	2.4E-09	2.6E-09	3.7E-09	7.6E-09	4.8E-08	2.2E-07	7.8E-07
5GA	0.	6.5E-09	6.5E-09	6.5E-09	6.6E-09	6.9E-09	8.0E-09	1.2E-08	3.7E-08	1.4E-07	4.7E-07
5TA	0.	9.8E-09	9.8E-09	9.8E-09	9.8E-09	9.8E-09	9.8E-09	9.9E-09	1.0E-08	1.3E-08	2.7E-08
6GA	0.	8.4E-09	8.4E-09	8.4E-09	8.4E-09	8.4E-09	8.5E-09	8.7E-09	1.1E-08	1.8E-08	3.9E-08
6TA	0.	9.9E-09	9.9E-09	9.9E-09	9.9E-09	9.9E-09	1.0E-08	1.0E-08	1.1E-08	1.5E-08	2.7E-08
7GA	0.	8.0E-09	8.0E-09	8.0E-09	8.0E-09	8.0E-09	8.0E-09	8.0E-09	8.0E-09	8.0E-09	8.0E-09
7TA	0.	1.0E-08	1.0E-08	1.0E-08	1.0E-08	1.0E-08	1.0E-08	1.0E-08	1.0E-08	1.0E-08	1.0E-08
8GA	0.	6.8E-08	6.8E-08	6.8E-08	6.8E-08	6.9E-08	7.3E-08	8.6E-08	2.2E-07	7.7E-07	2.7E-06
9GA	0.	2.1E-07	2.1E-07	2.1E-07	2.1E-07	2.1E-07	2.1E-07	2.5E-07	5.6E-07	1.8E-06	6.3E-06

NOTE: 1. '1TA' WHEEL IDENTIFICATION REFERS TO FIRST TURBINE END WHEEL OF LP 'A' ROTOR
2. 'LAST INSP' REFERS TO TOTAL SERVICE TIME (YEARS) ACCUMULATED TO LAST INSPECTION
3. ALL PROBABILITIES EXPRESSED ON AN ANNUAL BASIS ('2.3E-03' IS EQUIVALENT TO 0.0023)

UTILITY: PUBLIC SERVICE ELECTRIC & GAS

LOCATION: BIG E CREEK #1

CLASS: ROTOR: 170X558 - LPA

REVISION: 2

WITHOUT PREPARING

TABLE 3

SUMMARY OF PROBABILITY INFORMATION FOR TOTAL ROTOR

05/20/85

YEAR	ID	INSP DATE	LAST INSP	IND SIZE	YEARS TO P (MISSILE)						YEARS TO P (BURST)						YEARS TO A > 1.0					YEARS TO A > 2.5				
					3E-6	5E-6	1E-5	1E-4	1E-3	1E-2	1E-3	1E-2	1E-1	5E-1	1E-3	1E-2	1E-1	5E-1	1E-3	1E-2	1E-1	5E-1	1E-3	1E-2	1E-1	5E-1
10A			0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
11A			0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
20A			0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
21A			0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
30A			0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
31A			0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
40A			0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
41A			0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
50A			0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
51A			0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
60A			0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
61A			0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
70A			0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
71A			0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
ROTOR			0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
UNIT			0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+

- NOTE: 1. 'LAST INSP' REFERS TO TOTAL SERVICE TIME (YEARS) ACCUMULATED TO LAST INSPECTION FROM THE LAST ROTOR INSPECTION, 'YEARS TO P (MISSILE)' REFERS TO THE ADDITIONAL SERVICE TIME (YEARS), MEASURED FROM THE LAST ROTOR INSPECTION, 'YEARS TO P (BURST)' REFERS TO THE ADDITIONAL SERVICE TIME (YEARS), MEASURED FROM THE LAST ROTOR INSPECTION, 'YEARS TO A > 1.0' REFERS TO THE ADDITIONAL SERVICE TIME (YEARS) REQUIRED TO REACH A SITUATION WHERE THE PROBABILITY OF FAILURE IS GREATER THAN ONE INCH IS EQUAL TO THE INDICATED LEVEL (E.G. '1E-3').
2. 'YEARS TO P (MISSILE)' REFERS TO THE ADDITIONAL SERVICE TIME (YEARS) REQUIRED TO REACH A SITUATION WHERE THE PROBABILITY OF FAILURE IS GREATER THAN ONE INCH IS EQUAL TO THE INDICATED LEVEL (E.G. '1E-3').
3. 'YEARS TO A > 1.0' REFERS TO THE ADDITIONAL SERVICE TIME (YEARS) REQUIRED TO REACH A SITUATION WHERE THE PROBABILITY OF FAILURE IS GREATER THAN ONE INCH IS EQUAL TO THE INDICATED LEVEL (E.G. '1E-3').
4. WHICH TABLE VALUE OF 'YEARS TO' ARE EXTRAPOLATED TO BE GREATER THAN 6.0 YEARS, THEY ARE REPORTED AS '6.0+'.

UTILITY: PUBLIC SERVICE ELECTRIC & GAS
 STATION: TAPE CREEK #1
 TB. NO./ROTOR: 170X558 - LPB
 LEVISED 2
 WITHOUT PREWARMING

TABLE 4
 SUMMARY OF MISSILE PROBABILITIES

05/20/85

WHEEL ID	LAST INSP	TIME MEASURED FROM LAST ROTOR INSPECTION									
		0. YRS	0.5 YRS	1.0 YRS	1.5 YRS	2.0 YRS	2.5 YRS	3.0 YRS	4.0 YRS	5.0 YRS	6.0 YRS
1GB	0.	6.1E-10	6.1E-10	6.1E-10	6.1E-10	6.1E-10	6.1E-10	6.1E-10	6.2E-10	6.3E-10	7.0E-10
1TB	0.	8.2E-10	8.2E-10	8.2E-10	8.2E-10	8.2E-10	8.2E-10	8.2E-10	8.2E-10	8.3E-10	8.6E-10
2GB	0.	7.3E-10	7.3E-10	7.3E-10	7.3E-10	7.3E-10	7.3E-10	7.3E-10	7.3E-10	7.4E-10	7.5E-10
2TB	0.	7.9E-10	7.9E-10	7.9E-10	7.9E-10	7.9E-10	8.0E-10	8.0E-10	8.0E-10	8.3E-10	9.5E-10
3GB	0.	1.6E-09	1.6E-09	1.6E-09	1.6E-09	1.6E-09	1.7E-09	1.7E-09	1.7E-09	1.9E-09	2.7E-09
3TB	0.	1.7E-09	1.7E-09	1.7E-09	1.7E-09	1.7E-09	1.7E-09	1.7E-09	1.8E-09	2.6E-09	5.3E-09
4GB	0.	2.0E-09	2.0E-09	2.0E-09	2.0E-09	2.0E-09	2.0E-09	2.0E-09	2.0E-09	2.0E-09	2.3E-09
4TB	0.	6.7E-10	6.7E-10	6.7E-10	6.7E-10	6.7E-10	6.8E-10	7.2E-10	1.1E-09	2.6E-09	7.7E-09
5GB	0.	9.4E-09	9.4E-09	9.4E-09	9.4E-09	9.4E-09	9.4E-09	9.5E-09	1.0E-08	1.3E-08	2.5E-08
5TB	0.	9.8E-09	9.8E-09	9.8E-09	9.8E-09	9.8E-09	9.8E-09	9.8E-09	1.0E-08	1.1E-08	1.6E-08
6GB	0.	6.0E-09	6.0E-09	6.0E-09	6.0E-09	6.1E-09	6.9E-09	1.0E-08	4.1E-08	1.2E-07	3.2E-07
6TB	0.	6.9E-09	6.9E-09	6.9E-09	6.9E-09	6.9E-09	6.9E-09	6.9E-09	7.1E-09	7.7E-09	9.6E-09
7GB	0.	9.8E-09	9.8E-09	9.8E-09	9.8E-09	9.8E-09	9.8E-09	9.8E-09	9.8E-09	9.8E-09	9.8E-09
7TB	0.	1.1E-08	1.1E-08	1.1E-08	1.1E-08	1.1E-08	1.1E-08	1.1E-08	1.1E-08	1.1E-08	1.1E-08
LPB	0.	6.2E-08	6.2E-08	6.2E-08	6.2E-08	6.2E-08	6.3E-08	6.6E-08	9.8E-08	1.8E-07	4.2E-07
UNIT	0.	1.8E-07	1.8E-07	1.8E-07	1.8E-07	1.9E-07	1.9E-07	1.9E-07	2.5E-07	4.5E-07	1.1E-06

NOTE: 1. '1TA' WHEEL IDENTIFICATION REFERS TO FIRST TURBINE END WHEEL OF LP 'A' ROTOR
 2. 'LAST INSP' REFERS TO TOTAL SERVICE TIME (YEARS) ACCUMULATED TO LAST INSPECTION
 3. ALL PROBABILITIES EXPRESSED ON AN ANNUAL BASIS ('2.3E-03' IS EQUIVALENT TO 0.0023)

UTILITY: PUBLIC SERVICE ELECTRIC & GAS
 STATION: HOPE CREEK #1
 ID. NO. / ROTOR: 170X558 - LPB
 REVISION 2
 WITHOUT PREWARMING

TABLE 5
 SUMMARY OF BURST PROBABILITIES

05/20/85

WHEEL ID	LAST INSP	ADDITIONAL SERVICE TIME MEASURED FROM LAST ROTOR INSPECTION									
		0. YRS	0.5 YRS	1.0 YRS	1.5 YRS	2.0 YRS	2.5 YRS	3.0 YRS	4.0 YRS	5.0 YRS	6.0 YRS
1CB	0.	6.1E-10	6.1E-10	6.1E-10	6.1E-10	6.1E-10	6.2E-10	6.2E-10	7.1E-10	1.4E-09	4.5E-09
1TB	0.	8.2E-10	8.2E-10	8.2E-10	8.2E-10	8.2E-10	8.2E-10	8.2E-10	8.6E-10	1.2E-09	2.9E-09
2GB	0.	1.4E-09	1.4E-09	1.4E-09	1.4E-09	1.4E-09	1.4E-09	1.4E-09	1.5E-09	2.0E-09	4.6E-09
2TB	0.	1.6E-09	1.6E-09	1.6E-09	1.6E-09	1.6E-09	1.6E-09	1.6E-09	2.4E-09	6.8E-09	2.6E-08
3GB	0.	2.4E-09	2.4E-09	2.4E-09	2.4E-09	2.4E-09	2.6E-09	3.4E-09	1.3E-08	6.1E-08	2.5E-07
3TB	0.	2.4E-09	2.4E-09	2.4E-09	2.4E-09	2.4E-09	2.6E-09	3.2E-09	1.1E-08	4.9E-08	2.0E-07
4GB	0.	6.4E-09	6.4E-09	6.4E-09	6.4E-09	6.4E-09	6.4E-09	6.5E-09	8.2E-09	1.8E-08	6.0E-08
4TB	0.	2.1E-09	2.1E-09	2.1E-09	2.1E-09	2.6E-09	4.0E-09	9.4E-09	6.7E-08	3.1E-07	1.1E-06
5GB	0.	9.7E-09	9.7E-09	9.7E-09	9.7E-09	9.8E-09	9.8E-09	9.9E-09	1.1E-08	1.7E-08	4.1E-08
5TB	0.	1.0E-08	1.0E-08	1.0E-08	1.0E-08	1.0E-08	1.0E-08	1.0E-08	1.1E-08	1.3E-08	2.2E-08
6GB	0.	6.0E-09	6.0E-09	6.0E-09	6.0E-09	6.2E-09	7.5E-09	1.3E-08	5.9E-08	1.7E-07	4.9E-07
6TB	0.	7.0E-09	7.0E-09	7.0E-09	7.0E-09	7.0E-09	7.0E-09	7.0E-09	7.3E-09	8.1E-09	1.1E-08
7GB	0.	9.8E-09	9.8E-09	9.8E-09	9.8E-09	9.8E-09	9.8E-09	9.8E-09	9.8E-09	9.8E-09	9.8E-09
7TB	0.	1.1E-08	1.1E-08	1.1E-08	1.1E-08	1.1E-08	1.1E-08	1.1E-08	1.1E-08	1.1E-08	1.1E-08
LPB	0.	7.1E-08	7.1E-08	7.1E-08	7.1E-08	7.2E-08	7.5E-08	8.7E-08	2.1E-07	6.8E-07	2.3E-06
UNIT	0.	2.1E-07	2.1E-07	2.1E-07	2.1E-07	2.1E-07	2.2E-07	2.5E-07	5.6E-07	1.8E-06	6.3E-06

- NOTE: 1. '1TA' WHEEL IDENTIFICATION REFERS TO FIRST TURBINE END WHEEL OF LP 'A' ROTOR
 2. 'LAST INSP' REFERS TO TOTAL SERVICE TIME (YEARS) ACCUMULATED TO LAST INSPECTION
 3. ALL PROBABILITIES EXPRESSED ON AN ANNUAL BASIS ('2.3E-03' IS EQUIVALENT TO 0.0023)

UTILITY: PUBLIC SERVICE ELECTRIC & GAS
 STATION: HOPE CREEK #1
 ID. NO./ROTOR: 170X558 - LPB
 REVISION 2
 WITHOUT PREWARMING

TABLE 6
 SUMMARY OF PROBABILITY INFORMATION FOR TOTAL ROTOR

05/20/85

UNIT ID	WHL ID	INSP DATE	LAST INSP	IND SIZE	YEARS TO P(MISSILE)				YEARS TO P(BURST)				YEARS TO A>1.0				YEARS TO A>2.5			
					3E-6	5E-6	1E-5	1E-4	1E-5	1E-4	1E-3	1E-2	1E-3	1E-2	1E-1	5E-1	1E-3	1E-2	1E-1	5E-1
1TB	1GB		0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	5.9	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
	1TB		0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	5.9	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
2TB	2GB		0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	5.3	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
	2TB		0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	5.3	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
3TB	3GB		0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	3.6	4.9	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
	3TB		0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	3.6	4.9	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
4TB	4GB		0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	5.7	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
	4TB		0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	5.7	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
5TB	5GB		0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
	5TB		0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
6TB	6GB		0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
	6TB		0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
7TB	7GB		0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
	7TB		0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
ROTOR			0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	3.2	4.3	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
UNIT			0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	2.9	3.7	5.3	6.0+	6.0+	6.0+	6.0+	6.0+

- NOTE: 1. 'LAST INSP' REFERS TO TOTAL SERVICE TIME (YEARS) ACCUMULATED TO LAST INSPECTION
 2. 'YEARS TO P(MISSILE)' REFERS TO THE ADDITIONAL SERVICE TIME (YEARS), MEASURED FROM THE LAST ROTOR INSPECTION, REQUIRED TO REACH THE INDICATED LEVEL OF MISSILE PROBABILITY (E.G. '3E-6'); SIMILARLY FOR P(BURST)
 3. 'YEARS TO A>1.0' REFERS TO THE ADD'L SERVICE TIME (YEARS) REQUIRED TO REACH A SITUATION WHERE THE PROBABILITY OF HAVING A CRACK DEPTH GREATER THAN ONE INCH IS EQUAL TO THE INDICATED LEVEL (E.G. '1E-3')
 4. WHEN TABLE VALUE OF 'YEARS TO' ARE EXTRAPOLATED TO BE GREATER THAN 6.0 YEARS, THEY ARE REPORTED AS '6.0+'

UTILITY: PUBLIC SERVICE ELECTRIC & GAS
 STATION: HOPE CREEK #1
 WHEEL/ROTOR: 170X550 - LPC
 REVISION 2
 WITHOUT PREWARMING

TABLE 7
 SUMMARY OF MISSILE PROBABILITIES

05/20/85

WHEEL ID	LAST INSP	TIME MEASURED FROM LAST ROTOR INSPECTION									
		0. YRS	0.5 YRS	1.0 YRS	1.5 YRS	2.0 YRS	2.5 YRS	3.0 YRS	4.0 YRS	5.0 YRS	6.0 YRS
1GC	0.	9.4E-10	9.4E-10	9.4E-10	9.4E-10	9.4E-10	9.4E-10	9.4E-10	9.4E-10	9.4E-10	9.7E-10
1TC	0.	2.0E-09	2.0E-09	2.0E-09	2.0E-09	2.0E-09	2.0E-09	2.0E-09	2.0E-09	2.0E-09	2.0E-09
2GC	0.	6.9E-10	6.9E-10	6.9E-10	6.9E-10	6.9E-10	6.9E-10	6.9E-10	6.9E-10	6.9E-10	7.1E-10
2TC	0.	6.3E-10	6.3E-10	6.3E-10	6.3E-10	6.3E-10	6.3E-10	6.3E-10	6.3E-10	6.4E-10	6.6E-10
3GC	0.	1.5E-09	1.5E-09	1.5E-09	1.5E-09	1.5E-09	1.5E-09	1.5E-09	1.7E-09	2.6E-09	5.9E-09
3TC	0.	1.4E-09	1.4E-09	1.4E-09	1.4E-09	1.4E-09	1.4E-09	1.4E-09	1.5E-09	2.1E-09	4.3E-09
4GC	0.	1.5E-09	1.5E-09	1.5E-09	1.5E-09	1.5E-09	1.5E-09	1.5E-09	1.5E-09	1.6E-09	2.1E-09
4TC	0.	1.4E-09	1.4E-09	1.4E-09	1.4E-09	1.4E-09	1.4E-09	1.4E-09	1.5E-09	1.8E-09	2.8E-09
5GC	0.	8.4E-09	8.4E-09	8.4E-09	8.4E-09	8.5E-09	8.5E-09	8.6E-09	9.6E-09	1.5E-08	3.7E-08
5TC	0.	4.8E-09	4.8E-09	4.8E-09	4.8E-09	4.8E-09	5.1E-09	6.1E-09	1.5E-08	5.9E-08	2.2E-07
6GC	0.	1.0E-08	1.0E-08	1.0E-08	1.0E-08	1.0E-08	1.0E-08	1.0E-08	1.1E-08	1.3E-08	2.0E-08
6TC	0.	7.8E-09	7.8E-09	7.8E-09	7.8E-09	7.8E-09	7.8E-09	7.9E-09	8.6E-09	1.1E-08	1.9E-08
7GC	0.	1.1E-08	1.1E-08	1.1E-08	1.1E-08	1.1E-08	1.1E-08	1.1E-08	1.1E-08	1.1E-08	1.1E-08
7TC	0.	9.8E-09	9.8E-09	9.8E-09	9.8E-09	9.8E-09	9.8E-09	9.8E-09	9.8E-09	9.8E-09	9.8E-09
LVC	0.	6.2E-08	6.2E-08	6.2E-08	6.2E-08	6.2E-08	6.3E-08	6.4E-08	7.6E-08	1.3E-07	3.4E-07
UNIT	0.	1.8E-07	1.8E-07	1.8E-07	1.8E-07	1.9E-07	1.9E-07	1.9E-07	2.5E-07	4.5E-07	1.1E-06

- NOTE: 1. '1TA' WHEEL IDENTIFICATION REFERS TO FIRST TURBINE END WHEEL OF LP 'A' ROTOR
 2. 'LAST INSP' REFERS TO TOTAL SERVICE TIME (YEARS) ACCUMULATED TO LAST INSPECTION
 3. ALL PROBABILITIES EXPRESSED ON AN ANNUAL BASIS ('2.3E-03' IS EQUIVALENT TO 0.0023)

UTILITY: PUBLIC SERVICE ELECTRIC & GAS

STATION: HOPE CREEK #1

UNIT ID./ROTOR: 170X553 - LPC

REVISION 2

WITHOUT PREHEATING

TABLE 8
SUMMARY OF BURST PROBABILITIES

05/20/85

WHEEL ID	LAST INSP	ADDITIONAL SERVICE TIME MEASURED FROM LAST ROTOR INSPECTION						3.0 YRS	4.0 YRS	5.0 YRS	6.0 YRS
		0. YRS	0.5 YRS	1.0 YRS	1.5 YRS	2.0 YRS	2.5 YRS				
1GC	0.	9.4E-10	9.4E-10	9.4E-10	9.4E-10	9.4E-10	9.4E-10	9.4E-10	9.7E-10	1.2E-09	2.3E-09
1TC	0.	2.0E-09	2.0E-09	2.0E-09	2.0E-09	2.0E-09	2.0E-09	2.0E-09	2.0E-09	2.3E-09	3.6E-09
2GC	0.	1.3E-09	1.3E-09	1.3E-09	1.3E-09	1.3E-09	1.3E-09	1.3E-09	1.4E-09	2.1E-09	5.2E-09
2TC	0.	1.2E-09	1.2E-09	1.2E-09	1.2E-09	1.2E-09	1.2E-09	1.2E-09	1.3E-09	2.0E-09	5.6E-09
3GC	0.	2.1E-09	2.1E-09	2.1E-09	2.1E-09	2.2E-09	2.4E-09	3.1E-09	1.3E-08	6.1E-08	2.5E-07
3TC	0.	2.0E-09	2.0E-09	2.0E-09	2.0E-09	2.0E-09	2.1E-09	2.6E-09	8.4E-09	3.9E-08	1.6E-07
4GC	0.	4.7E-09	4.7E-09	4.7E-09	4.7E-09	4.7E-09	4.8E-09	5.0E-09	8.3E-09	2.7E-08	1.0E-07
4TC	0.	4.5E-09	4.5E-09	4.5E-09	4.5E-09	4.6E-09	4.8E-09	5.7E-09	1.5E-08	6.0E-08	2.2E-07
5GC	0.	8.7E-09	8.7E-09	8.7E-09	8.7E-09	8.7E-09	8.8E-09	9.0E-09	1.1E-08	2.2E-08	6.7E-08
5TC	0.	4.9E-09	4.9E-09	4.9E-09	4.9E-09	5.0E-09	5.6E-09	7.7E-09	2.6E-08	1.1E-07	4.4E-07
6GC	0.	1.0E-08	1.0E-08	1.0E-08	1.0E-08	1.0E-08	1.0E-08	1.0E-08	1.1E-08	1.5E-08	2.6E-08
6TC	0.	7.9E-09	7.9E-09	7.9E-09	7.9E-09	7.9E-09	7.9E-09	8.0E-09	9.1E-09	1.3E-08	2.4E-08
7GC	0.	1.1E-08	1.1E-08	1.1E-08	1.1E-08	1.1E-08	1.1E-08	1.1E-08	1.1E-08	1.1E-08	1.1E-08
7TC	0.	9.8E-09	9.8E-09	9.8E-09	9.8E-09	9.8E-09	9.8E-09	9.8E-09	9.8E-09	9.8E-09	9.8E-09
LPC	0.	7.2E-08	7.2E-08	7.2E-08	7.2E-08	7.2E-08	7.3E-08	7.8E-08	1.3E-07	3.8E-07	1.3E-06
UNIT	0.	2.1E-07	2.1E-07	2.1E-07	2.1E-07	2.1E-07	2.2E-07	2.5E-07	5.6E-07	1.8E-06	6.3E-06

- NOTE: 1. 'ITA' WHEEL IDENTIFICATION REFERS TO FIRST TURBINE END WHEEL OF LP 'A' ROTOR
 2. 'LAST INSP' REFERS TO TOTAL SERVICE TIME (YEARS) ACCUMULATED TO LAST INSPECTION
 3. ALL PROBABILITIES EXPRESSED ON AN ANNUAL BASIS ('2.3E-03' IS EQUIVALENT TO 0.0023)

UTILITY: PUBLIC SERVICE ELECTRIC & GAS
 STATION: HOPE CREEK #1
 ID NO./ROTOR: 170X553 - LPC
 REVISION 2
 WITHOUT PREWARMING

TABLE 9
 SUMMARY OF PROBABILITY INFORMATION FOR TOTAL ROTOR

05/20/85

RTR TO	WHL ID	INSP DATE	LAST INSP	IND SIZE	YEARS TO P(MISSILE)				YEARS TO P(BURST)				YEARS TO A>1.0				YEARS TO A>2.5			
					3E-6	5E-6	1E-5	1E-4	1E-5	1E-4	1E-3	1E-2	1E-3	1E-2	1E-1	5E-1	1E-3	1E-2	1E-1	5E-1
LPC	16C		0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	5.9	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
	1TC		0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	5.9	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
	26C		0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	5.3	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
	2TC		0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	5.3	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
	36C		0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	3.6	4.9	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
	3TC		0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	3.6	4.9	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
	46C		0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	5.7	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
	4TC		0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	5.7	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
	56C		0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
	5TC		0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
	66C		0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
	6TC		0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
	76C		0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
	7TC		0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
ROTOR			0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	3.2	4.3	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+
UNIT			0.	0.	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	6.0+	2.9	3.7	5.3	6.0+	6.0+	6.0+	6.0+	6.0+

- NOTE: 1. 'LAST INSP' REFERS TO TOTAL SERVICE TIME (YEARS) ACCUMULATED TO LAST INSPECTION
 2. 'YEARS TO P(MISSILE)' REFERS TO THE ADDITIONAL SERVICE TIME (YEARS), MEASURED FROM THE LAST ROTOR INSPECTION, REQUIRED TO REACH THE INDICATED LEVEL OF MISSILE PROBABILITY (E.G. '3E-6'); SIMILARLY FOR P(BURST)
 3. 'YEARS TO A>1.0' REFERS TO THE ADD'L SERVICE TIME (YEARS) REQUIRED TO REACH A SITUATION WHERE THE PROBABILITY OF HAVING A CRACK DEPTH GREATER THAN ONE INCH IS EQUAL TO THE INDICATED LEVEL (E.G. '1E-3')
 4. WHEN TABLE VALUE OF 'YEARS TO' ARE EXTRAPOLATED TO BE GREATER THAN 6.0 YEARS, THEY ARE REPORTED AS '6.0+'

10.2.3.5 Preservice Inspection

The preservice inspection program is as follows:

- a. Wheel and rotor forgings are rough-machined with minimum stock allowance prior to heat treatment
- b. Each rotor and wheel forging is subjected to a 100% volumetric (ultrasonic) examination. Each machine-finished rotor and wheel is subjected to a surface magnetic particle and visual examination. Results of this examination are evaluated by use of General Electric (GE) acceptance criteria. These criteria are more restrictive than those specified for Class 1 components in the ASME B&PV Code, Sections III and V, and include the requirement that subsurface sonic indications are either removed or evaluated to ensure that they do not grow to a size that compromises the integrity of the unit during the service life of the unit.
- c. All machine-finished surfaces are subjected to a magnetic-particle examination. No magnetic-particle flaw indications are permissible in bores, holes, keyways, and other high stressed regions.
- d. Each fully bucketed turbine rotor assembly is spin-tested at or above the maximum speed anticipated following a load rejection from full load.

10.2.3.6 Inservice Inspection

REPLACE WITH

INSERT A

The inservice inspection program for the turbine assembly and valves includes the following:

- a. During outages for inservice inspections and refueling, portions of the turbine-generator are disassembled for inspection. Those portions of the turbine-generator to be inspected are determined both by the performance of each element or piece of equipment and by previous experience and inspections, industry experience, and good industry practices.

This inspection consists of visual, surface, and volumetric examinations, as follows:

1. When critical areas of the unit are exposed during inspections, they are nondestructively tested by ultrasonic testing, magnetic-particle testing, liquid penetrant, or eddy-current testing, and receive a complete visual inspection. In some cases, more than one method is used to ensure the integrity of the piece. Those areas normally tested include, but are not limited to, the rotors, wheel bores, keyways, bucket dovetails, pins of finger-type dovetails, bearing journals, couplings, coupling bolts, nozzle blocks, diaphragms, buckets, valve stems, valves, and pins. These inspections will be conducted at approximately 10-year intervals.

- b. The main stop valves, control valves, and combined intermediate valves are inspected and nondestructively tested at a frequency based upon their operation, operational tests, industry experience, and good industry practices. Critical areas such as the valve stem, seats, valves, bushings, and casings receive an ultrasonic test, liquid penetrant test, or magnetic-particle test, and a thorough visual inspection. At least one valve of each type will be dismantled for inspection at approximately 3-1/3-year intervals. If unacceptable flaws or excessive corrosion are found in a valve, all valves of its type are inspected. Valve bushings are inspected and cleaned, and bore diameters are checked for proper clearance.

- c. Main stop and combined intermediate valves are exercised at least once a week by closing each valve and observing by the valve position indicator that it moves smoothly to a fully closed position. High pressure turbine control valves are exercised at least once a month through at least one complete cycle from the running position. Proper valve motion is verified by observing the valve position indicator.

d. →

10.2.4 SAFETY EVALUATION

The turbine-generator has no safety-related function. Failure of the system does not compromise any safety-related system or component or prevent a safe shutdown of the plant.

HCGS FSAR

INSERT A to FSAR Section 10.2.3.6

The following turbine system maintenance program is based upon the manufacturer's recommendations and calculations of missile generation probabilities.

- a. The in-service inspection program for the turbine assembly includes disassembly of the turbine in stages over a six year interval during plant shutdowns such that the turbine is inspected within six years. This includes complete inspection of all normally inaccessible parts, such as couplings, coupling bolts, turbine shafts, low pressure turbine buckets, and low pressure wheels. This inspection consists of visual, surface, and volumetric examinations, as indicated below:
 1. A thorough volumetric examination of all low pressure wheels, including areas immediately adjacent to keyways and bores, is conducted.
 2. Visual examination of all accessible surfaces of rotors and wheels.
 3. Visual and surface examination of all low pressure buckets.
 4. 100% surface examination of couplings and coupling bolts.

INSERT B to FSAR Section 10.2.3.6

- d. The extraction check valves will be tested weekly with the turbine on-line and loaded to assure that each valve is capable of being actuated by its power cylinder, and to exercise the mechanism so as to keep it free to move.