PHILADELPHIA ELECTRIC COMPANY
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(215) 841-4500

JOHN S. KEMPER
SENIOR VICE-PRESIDENT - NUCLEAR

August 19, 1988

Mr. T. E. Murley, Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Station P1-137
Washington, DC 20555

Docket No. 50-353

Subject: Limerick Generating Station, Unit #2
Turbine System Maintenance Program

References:
1) J. W. Gallagher (PECo) to W. R. Butler (NRC), "Turbine System Maintenance Program, LGS-1", May [illegible], 1987
2) R. J. Clark (NRC) to E. G. Bauer, Jr., "Turbine System Maintenance Program", November 3, 1987

Dear Mr. Murley:

Section 3.5.1.3.3 of the Safety Evaluation Report (SER), NUREG-0991, for Limerick Generating Station (LGS) indicates that Philadelphia Electric Company (PECo) should submit" a turbine system maintenance program based on the manufacturer's calculations of missile generation probabilities", for NRC approval. Such a program was submitted for LGS-Unit 1 with reference 1 and approved by your staff in reference 2. A similar program for LGS Unit 2 is discussed below and is attached.

Philadelphia Electric Company plans to implement a turbine system maintenance program which requires inspection of the low pressure turbine rotors for the unit over a six operating-years interval during scheduled outages. The program is based upon the results of the probabilistic evaluation of the low pressure turbines performed by the General Electric Company (GE). The evaluation used the methodology of the GE proprietary report, Probability of Missile Generation in General Electric Nuclear Turbines, dated January 1984. This methodology has been reviewed by the NRC staff and found acceptable for use in establishing maintenance and inspection schedules for specific turbine systems (see NUREG-1048, Safety Evaluation Report related to the operation of Hope Creek Generating Station Supplement No. 6, July, 1986).

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The proposed maintenance program, which is based upon the program evaluated in NUREG-1048, assures that the probability of a turbine generating a missile is maintained less than 1E-5 per year, which is consistent with sections 3.5.1.3 and 2.2.3 of the Standard Review Plan. The program takes into account specific turbine wheel operating conditions, material properties, results of periodic in-service inspections, and other factors. The program's determination of missile probability is based upon the probabilities of the individual parameters which may lead to the generation of a turbine missile. As a result, the program can facilitate evaluations of the effects of changes in any parameter.

The results of the GE low pressure turbine evaluation for Unit 2 (See Attachment) demonstrate that the turbine inspection intervals can be established at six (6.0) operating years with the probability of generating a missile remaining less than 1E-5 per year. Attachment 3 provides curves of the probability of each rotor generating a missile versus the number of operating years since the latest turbine inspection.

The turbine system maintenance program and the revision to the methodology of projecting turbine missile generation will be included in FSAR Sections 10.2.3.6 and 3.5.1.3, respectively, during a future update of the FSAR. Should you have any questions or require additional information, please do not hesitate to contact us.

Sincerely,

John S. Kemper

ERG/bls/07078803y

Attachments

Copy to: Addressee
R. J. Clark, LGS Project Manager
W. T. Russell, Region I Administrator
R. A. Gramm, LGS Unit 2 Senior Resident Inspector

ATTACHMENT

TABLES

Figures

ERG/bls/07298803

UTILITY: PHILADELPHIA ELECTRIC
STATION: LIMERICK #2
TB NO./ROTOR: 170X464 - LPA
REVISION 3
WITHOUT PREWARMING

TABLE 1TA
SUMMARY OF MISSILE PROBABILITIES

03/27/86

WHEEL ID	SERV TIME	ADDITIONAL SERVICE TIME MEASURED FROM LATEST 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.	7.7E-09	7.7E-09	7.7E-09	7.7E-09	7.7E-09	7.7E-09	7.7E-09	7.7E-09	7.7E-09	7.8E-09
1TA	0.	6.2E-09	6.2E-09	6.2E-09	6.2E-09	6.2E-09	6.2E-09	6.2E-09	6.2E-09	6.2E-09	6.3E-09
2GA	0.	3.9E-09	3.9E-09	3.9E-09	3.9E-09	3.9E-09	3.9E-09	3.9E-09	3.9E-09	3.9E-09	4.1E-09
2TA	0.	2.8E-09	2.8E-09	2.8E-09	2.8E-09	2.8E-09	2.8E-09	2.8E-09	2.8E-09	2.9E-09	3.0E-09
3GA	0.	5.8E-09	5.8E-09	5.8E-09	5.8E-09	5.8E-09	5.8E-09	5.8E-09	6.1E-09	7.1E-09	1.0E-08
3TA	0.	7.0E-09	7.0E-09	7.0E-09	7.0E-09	7.0E-09	7.0E-09	7.1E-09	7.4E-09	8.4E-09	1.2E-08
4GA	0.	7.6E-09	7.6E-09	7.6E-09	7.6E-09	7.6E-09	7.6E-09	7.6E-09	7.6E-09	7.6E-09	7.8E-09
4TA	0.	3.5E-09	3.5E-09	3.5E-09	3.5E-09	3.5E-09	3.5E-09	3.5E-09	3.5E-09	3.8E-09	4.6E-09
5GA	0.	2.0E-08	2.0E-08	2.0E-08	2.0E-08	2.0E-08	2.1E-08	2.1E-08	2.1E-08	2.3E-08	2.8E-08
5TA	0.	3.6E-08	3.6E-08	3.6E-08	3.6E-08	3.6E-08	3.6E-08	3.7E-08	4.3E-08	6.9E-08	1.6E-07
6GA	0.	3.9E-08	3.9E-08	3.9E-08	3.9E-08	3.9E-08	3.9E-08	4.0E-08	4.6E-08	6.4E-08	1.1E-07
6TA	0.	3.7E-08	3.7E-08	3.7E-08	3.7E-08	3.7E-08	3.8E-08	4.2E-08	7.5E-08	1.6E-07	3.8E-07
7GA	0.	5.7E-08	5.7E-08	5.7E-08	5.7E-08	5.7E-08	5.7E-08	5.7E-08	5.7E-08	5.7E-08	5.7E-08
7TA	0.	6.1E-08	6.1E-08	6.1E-08	6.1E-08	6.1E-08	6.1E-08	6.1E-08	6.1E-08	6.1E-08	6.1E-08
LPA	0.	2.9E-07	2.9E-07	2.9E-07	2.9E-07	2.9E-07	3.0E-07	3.0E-07	3.5E-07	4.8E-07	8.6E-07
UNIT	0.	8.2E-07	8.2E-07	8.2E-07	8.2E-07	8.2E-07	8.3E-07	8.4E-07	9.8E-07	1.4E-06	2.7E-06

NOTE: 1. '1TA' WHEEL IDENTIFICATION REFERS TO FIRST TURBINE END WHEEL OF LP 'A' ROTOR
2. 'SERV TIME' 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: PHILADELPHIA ELECTRIC
STATION: LIMERICK #2
TD.NO./ROTOR: 170::464 - LPA
REVISION 3
WITHOUT PREWARMING

TABLE 1TIA
SUMMARY OF BURST PROBABILITIES

03/27/86

WHEEL ID	SERV TIME	ADDITIONAL SERVICE TIME MEASURED FROM LATEST 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.	7.7E-09	7.7E-09	7.7E-09	7.7E-09	7.7E-09	7.7E-09	7.7E-09	7.8E-09	8.4E-09	1.1E-08
1TA	0.	6.2E-09	6.2E-09	6.2E-09	6.2E-09	6.2E-09	6.2E-09	6.2E-09	6.3E-09	7.2E-09	1.1E-08
2GA	0.	7.6E-09	7.6E-09	7.6E-09	7.6E-09	7.6E-09	7.6E-09	7.7E-09	8.5E-09	1.2E-08	2.6E-08
2TA	0.	5.5E-09	5.5E-09	5.5E-09	5.5E-09	5.5E-09	5.5E-09	5.6E-09	6.5E-09	1.1E-08	2.8E-08
3GA	0.	8.2E-09	8.2E-09	8.2E-09	8.2E-09	8.3E-09	8.5E-09	9.2E-09	1.8E-08	6.0E-08	2.2E-07
3TA	0.	1.0E-08	1.0E-08	1.0E-08	1.0E-08	1.0E-08	1.0E-08	1.1E-08	2.1E-08	6.9E-08	2.5E-07
4GA	0.	2.4E-08	2.4E-08	2.4E-08	2.4E-08	2.4E-08	2.4E-08	2.4E-08	2.5E-08	2.9E-08	4.7E-08
4TA	0.	1.1E-08	1.1E-08	1.1E-08	1.1E-08	1.1E-08	1.1E-08	1.2E-08	2.1E-08	5.9E-08	1.9E-07
5GA	0.	2.1E-08	2.1E-08	2.1E-08	2.1E-08	2.1E-08	2.1E-08	2.1E-08	2.2E-08	2.5E-08	3.4E-08
5TA	0.	3.7E-08	3.7E-08	3.7E-08	3.7E-08	3.7E-08	3.7E-08	3.9E-08	5.2E-08	1.0E-07	2.8E-07
6GA	0.	4.0E-08	4.0E-08	4.0E-08	4.0E-08	4.0E-08	4.0E-08	4.1E-08	5.0E-08	7.7E-08	1.5E-07
6TA	0.	3.7E-08	3.7E-08	3.7E-08	3.7E-08	3.7E-08	3.9E-08	4.4E-08	9.5E-08	2.2E-07	5.7E-07
7GA	0.	5.7E-08	5.7E-08	5.7E-08	5.7E-08	5.7E-08	5.7E-08	5.7E-08	5.7E-08	5.7E-08	5.7E-08
7TA	0.	6.1E-08	6.1E-08	6.1E-08	6.1E-08	6.1E-08	6.1E-08	6.1E-08	6.1E-08	6.1E-08	6.1E-08
LPA	0.	3.3E-07	3.3E-07	3.3E-07	3.3E-07	3.3E-07	3.4E-07	3.5E-07	4.5E-07	8.0E-07	1.9E-06
UNIT	0.	9.1E-07	9.1E-07	9.1E-07	9.1E-07	9.2E-07	9.3E-07	9.7E-07	1.3E-06	2.6E-06	6.8E-06

NOTE: 1. '1TA' WHEEL IDENTIFICATION REFERS TO FIRST TURBINE END WHEEL OF LP 'A' ROTOR
2. 'SERV TIME' 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: PHILADELPHIA ELECTRIC
STATION: LIMERICK #2
TB.NO./ROTOR: 170X464 - LPA
REVISION 3
WITHOUT PREWARMING

TABLE IVA

SUMMARY OF PROBABILITY INFORMATION FOR TOTAL ROTOR

03/27/86

RTR ID	WHL ID	INSP DATE	SERV TIME	IND SIZE	YEARS TO P(MISSILE) 3E-6	5E-6	1E-5	1E-4	YEARS TO P(BURST) 1E-5	1E-4	1E-3	1E-2	YEARS TO A>2.5 * 1E-3	1E-2	1E-1	5E-1
LPA	1GA		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+
	1TA		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+
	2GA		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+
	2TA		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+
	3GA		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+
	3TA		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+
	4GA		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+
	4TA		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+
	5GA		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+
	5TA		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+
	6GA		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+
	6TA		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+
	7GA		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+
	7TA		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+
	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+
	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+

NOTE: 1. 'SERV TIME' 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 LATEST INSPECTION, REQUIRED TO REACH THE INDICATED LEVEL OF MISSILE PROBABILITY (E.G. '3E-6'); SIMILARLY FOR P(BURST)
3. 'YEARS TO A>2.5' REFERS TO THE ADD'L SERVICE TIME (YEARS) REQUIRED TO REACH A SITUATION WHERE THE PROBABILITY OF HAVING A CRACK DEPTH GREATER THAN 2.5 INCHES 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+'
5. '*' SEE TEXT FOR DISCUSSION ON LIMITATIONS

UTILITY: PHILADELPHIA ELECTRIC
STATION: LIMERICK #2
TB NO./ROTOR: 170X464 - LPB
REVISION 3
WITHOUT PREWARMING

TABLE 11B
SUMMARY OF MISSILE PROBABILITIES

03/27/86

WHEEL ID	SERV TIME	ADDITIONAL SERVICE TIME MEASURED FROM LATEST 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.	4.4E-09	4.4E-09	4.4E-09	4.4E-09	4.4E-09	4.4E-09	4.4E-09	4.4E-09	4.4E-09	4.4E-09
1TB	0.	3.5E-09	3.5E-09	3.5E-09	3.5E-09	3.5E-09	3.5E-09	3.5E-09	3.5E-09	3.6E-09	3.6E-09
2GB	0.	5.8E-09	5.8E-09	5.8E-09	5.8E-09	5.8E-09	5.8E-09	5.8E-09	5.8E-09	5.8E-09	6.0E-09
2TB	0	3.9E-09	3.9E-09	3.9E-09	3.9E-09	3.9E-09	3.9E-09	3.9E-09	3.9E-09	4.0E-09	4.1E-09
3GB	0.	7.3E-09	7.3E-09	7.3E-09	7.3E-09	7.3E-09	7.3E-09	7.4E-09	7.6E-09	8.7E-09	1.2E-08
3TB	0.	3.3E-09	3.3E-09	3.3E-09	3.3E-09	3.3E-09	3.3E-09	3.4E-09	3.9E-09	6.1E-09	1.4E-08
4GB	0.	2.3E-09	2.3E-09	2.3E-09	2.3E-09	2.3E-09	2.3E-09	2.3E-09	2.4E-09	2.7E-09	3.7E-09
4TB	0.	2.4E-09	2.4E-09	2.4E-09	2.4E-09	2.4E-09	2.4E-09	2.4E-09	2.5E-09	2.8E-09	3.6E-09
5GB	0.	2.0E-08	2.0E-08	2.0E-08	2.0E-08	2.1E-08	2.4E-08	3.1E-08	7.5E-08	2.3E-07	6.9E-07
5TB	0.	1.8E-08	1.8E-08	1.8E-08	1.8E-08	1.8E-08	1.8E-08	1.8E-08	1.9E-08	2.1E-08	2.9E-08
6GB	0.	3.8E-08	3.8E-08	3.8E-08	3.8E-08	3.8E-08	3.9E-08	3.9E-08	4.7E-08	6.8E-08	1.3E-07
6TB	0.	4.2E-08	4.2E-08	4.2E-08	4.2E-08	4.2E-08	4.2E-08	4.2E-08	4.2E-08	4.3E-08	4.4E-08
7GB	0.	5.9E-08	5.9E-08	5.9E-08	5.9E-08	5.9E-08	5.9E-08	5.9E-08	5.9E-08	5.9E-08	5.9E-08
7TB	0.	5.6E-08	5.6E-08	5.6E-08	5.6E-08	5.6E-08	5.6E-08	5.6E-08	5.6E-08	5.6E-08	5.6E-08
LPB	0.	2.7E-07	2.7E-07	2.7E-07	2.7E-07	2.7E-07	2.7E-07	2.8E-07	3.3E-07	5.2E-07	1.1E-06
UNIT	0.	8.2E-07	8.2E-07	8.2E-07	8.2E-07	8.2E-07	8.3E-07	8.4E-07	9.8E-07	1.4E-06	2.7E-06

NOTE: 1. '1TA' WHEEL IDENTIFICATION REFERS TO FIRST TURBINE END WHEEL OF LP 'A' ROTOR
2. 'SERV TIME' 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: PHILADELPHIA ELECTRIC
STATION: LIMERICK #2
TB.NO./ROTOR: 170X464 - LPB
REVISION 3
WITHOUT PREWARMING

TABLE IIIB
SUMMARY OF BURST PROBABILITIES

03/27/86

WHEEL ID	SERV TIME	ADDITIONAL SERVICE TIME MEASURED FROM LATEST 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.	4.4E-09	4.4E-09	4.4E-09	4.4E-09	4.4E-09	4.4E-09	4.4E-09	4.4E-09	4.6E-09	5.3E-09
1TB	0.	3.5E-09	3.5E-09	3.5E-09	3.5E-09	3.5E-09	3.6E-09	3.6E-09	3.6E-09	3.8E-09	4.8E-09
2GB	0.	1.1E-08	1.1E-08	1.1E-08	1.1E-08	1.1E-08	1.1E-08	1.2E-08	1.3E-08	1.8E-08	3.9E-08
2TB	0.	7.6E-09	7.6E-09	7.6E-09	7.6E-09	7.6E-09	7.6E-09	7.7E-09	8.7E-09	1.3E-08	3.1E-08
3GB	0.	1.0E-08	1.0E-08	1.0E-08	1.0E-08	1.0E-08	1.1E-08	1.2E-08	2.1E-08	6.9E-08	2.5E-07
3TB	0.	4.7E-09	4.7E-09	4.7E-09	4.7E-09	4.8E-09	5.3E-09	7.2E-09	3.0E-08	1.4E-07	5.3E-07
4GB	0.	7.1E-09	7.1E-09	7.1E-09	7.1E-09	7.2E-09	7.5E-09	8.4E-09	1.8E-08	6.1E-08	2.1E-07
4TB	0.	7.6E-09	7.6E-09	7.6E-09	7.6E-09	7.7E-09	8.0E-09	8.9E-09	1.8E-08	5.4E-08	1.8E-07
5GB	0.	2.1E-08	2.1E-08	2.1E-08	2.1E-08	2.3E-08	2.8E-08	4.2E-08	1.3E-07	4.4E-07	1.4E-06
5TB	0.	1.8E-08	1.8E-08	1.8E-08	1.8E-08	1.8E-08	1.8E-08	1.8E-08	2.0E-08	2.4E-08	4.0E-08
6GB	0.	3.9E-08	3.9E-08	3.9E-08	3.9E-08	3.9E-08	3.9E-08	4.0E-08	.2E-08	8.4E-08	1.8E-07
6TB	0.	4.3E-08	4.3E-08	4.3E-08	4.3E-08	4.3E-08	4.3E-08	4.3E-08	4.3E-08	4.3E-08	4.5E-08
7GB	0.	5.9E-08	5.9E-08	5.9E-08	5.9E-08	5.9E-08	5.9E-08	5.9E-08	5.9E-08	5.9E-08	5.9E-08
7TB	0.	5.6E-08	5.6E-08	5.6E-08	5.6E-08	5.6E-08	5.6E-08	5.6E-08	5.6E-08	5.6E-08	5.6E-08
LPB	0.	2.9E-07	2.9E-07	2.9E-07	2.9E-07	2.9E-07	3.0E-07	3.2E-07	4.8E-07	1.1E-06	3.0E-06
UNIT	0.	9.1E-07	9.1E-07	9.1E-07	9.1E-07	9.2E-07	9.3E-07	9.7E-07	1.3E-06	2.6E-06	6.8E-06

NOTE: 1. '1TA' WHEEL IDENTIFICATION REFERS TO FIRST TURBINE END WHEEL OF LP 'A' ROTOR
2. 'SERV TIME' 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: PHILADELPHIA ELECTRIC
STATION: LIMERICK #2
TB.NO./ROTOR: 170X464 - LPB
REVISION 3
WITHOUT PREWARMING

TABLE IVB

SUMMARY OF PROBABILITY INFORMATION FOR TOTAL ROTOR

03/27/86

RTR ID	WHL ID	INSP DATE	SERV TIME	IND SIZE	YEARS TO P(MISSILE) 3E-6	5E-6	1E-5	1E-4	YEARS TO P(BURST) 1E-5	1E-4	1E-3	1E-2	YEARS TO A>2.5 * 1E-3	1E-2	1E-1	5E-1
LPB	1GB		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+
	1TB		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+
	2GB		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+
	2TB		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+
	3GB		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+
	3TB		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+
	4GB		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+
	4TB		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+
	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+
	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+
	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+
	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+
	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+
	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+
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+
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+

NOTE: 1. 'SERV TIME' 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 LATEST INSPECTION, REQUIRED TO REACH THE INDICATED LEVEL OF MISSILE PROBABILITY (E.G. '3E-6'); SIMILIARLY FOR P(BURST)
3. 'YEARS TO A>2.5' REFERS TO THE ADD'L SERVICE TIME (YEARS) REQUIRED TO REACH A SITUATION WHERE THE PROBABILITY OF HAVING A CRACK DEPTH GREATER THAN 2.5 INCHES 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+'
5. '*' SEE TEXT FOR DISCUSSION ON LIMITATIONS

UTILITY: PHILADELPHIA ELECTRIC
STATION: LIMERICK #2
TB.NO./ROTOR: 170X464 - LPC
REVISION 3
WITHOUT PREWARMING

TABLE 1TC
SUMMARY OF MISSILE PROBABILITIES

03/27/86

WHEEL ID	SERV TIME	ADDITIONAL SERVICE TIME MEASURED FROM LATEST 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.	7.5E-09	7.5E-09	7.5E-09	7.5E-09	7.5E-09	7.5E-09	7.5E-09	7.5E-09	7.5E-09	7.5E-09
1TC	0.	8.7E-09	8.7E-09	8.7E-09	8.7E-09	8.7E-09	8.7E-09	8.7E-09	8.7E-09	8.7E-09	8.8E-09
2GC	0.	6.1E-09	6.1E-09	6.1E-09	6.1E-09	6.1E-09	6.1E-09	6.1E-09	6.1E-09	6.2E-09	6.3E-09
2TC	0.	5.6E-09	5.6E-09	5.6E-09	5.6E-09	5.6E-09	5.6E-09	5.6E-09	5.6E-09	5.7E-09	5.8E-09
3GC	0.	4.4E-09	4.4E-09	4.4E-09	4.4E-09	4.4E-09	4.4E-09	4.5E-09	4.6E-09	5.2E-09	6.8E-09
3TC	0.	6.8E-09	6.8E-09	6.8E-09	6.8E-09	6.8E-09	6.8E-09	6.9E-09	7.2E-09	8.3E-09	1.2E-08
4GC	0.	2.4E-09	2.4E-09	2.4E-09	2.4E-09	2.4E-09	2.4E-09	2.4E-09	2.5E-09	2.8E-09	3.7E-09
4TC	0.	4.3E-09	4.3E-09	4.3E-09	4.3E-09	4.3E-09	4.3E-09	4.3E-09	4.4E-09	4.5E-09	4.8E-09
5GC	0.	3.3E-08	3.3E-08	3.3E-08	3.3E-08	3.4E-08	3.5E-08	3.8E-08	5.6E-08	1.2E-07	3.1E-07
5TC	0.	1.9E-08	1.9E-08	1.9E-08	1.9E-08	1.9E-08	1.9E-08	2.0E-08	2.0E-08	2.2E-08	2.9E-08
6GC	0.	3.6E-08	3.6E-08	3.6E-08	3.6E-08	3.6E-08	3.7E-08	3.9E-08	5.6E-08	1.0E-07	2.3E-07
6TC	0.	3.3E-08	3.3E-08	3.3E-08	3.3E-08	3.3E-08	3.4E-08	3.4E-08	3.5E-08	3.8E-08	4.8E-08
7GC	0.	4.0E-08	4.0E-08	4.0E-08	4.0E-08	4.0E-08	4.0E-08	4.0E-08	4.0E-08	4.0E-08	4.0E-08
7TC	0.	4.9E-08	4.9E-08	4.9E-08	4.9E-08	4.9E-08	4.9E-08	4.9E-08	4.9E-08	4.9E-08	4.9E-08
LPC	0.	2.6E-07	2.6E-07	2.6E-07	2.6E-07	2.6E-07	2.6E-07	2.6E-07	3.0E-07	4.2E-07	7.7E-07
UNIT	0.	8.2E-07	8.2E-07	8.2E-07	8.2E-07	8.2E-07	8.3E-07	8.4E-07	9.8E-07	1.4E-06	2.7E-06

NOTE: 1. '1TA' WHEEL IDENTIFICATION REFERS TO FIRST TURBINE END WHEEL OF LP 'A' ROTOR
2. 'SERV TIME' 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: PHILADELPHIA ELECTRIC
STATION: LIMERICK #2
TB.NO./ROTOR: 170X464 - LPC
REVISION 3
WITHOUT PREWARMING

TABLE IIIC
SUMMARY OF BURST PROBABILITIES

03/27/86

WHEEL ID	SERV TIME	ADDITIONAL SERVICE TIME MEASURED FROM LATEST 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	5.0 YRS
1GC	0.	7.5E-09	7.5E-09	7.5E-09	7.5E-09	7.5E-09	7.5E-09	7.5E-09	7.6E-09	7.9E-09	9.6E-09
1TC	0.	8.8E-09	8.8E-09	8.8E-09	8.8E-09	8.8E-09	8.8E-09	8.8E-09	[illegible]	9.2E-09	1.1E-08
2GC	0.	1.2E-08	1.2E-08	1.2E-08	1.2E-08	1.2E-08	1.2E-08	1.2E-08	1.3E-08	1.8E-08	3.5E-08
2TC	0.	1.1E-08	1.1E-08	1.1E-08	1.1E-08	1.1E-08	1.1E-08	1.1E-08	1.2E-08	1.7E-08	3.4E-08
3GC	0.	6.3E-09	6.3E-09	6.3E-09	6.3E-09	6.3E-09	6.4E-09	6.5E-09	9.0E-09	2.4E-08	9.3E-08
3TC	0.	9.7E-09	9.7E-09	9.7E-09	9.8E-09	9.8E-09	1.0E-08	1.1E-08	2.0E-08	6.8E-08	2.5E-07
4GC	0.	7.6E-09	7.6E-09	7.6E-09	7.6E-09	7.6E-09	7.9E-09	8.8E-09	1.8E-08	6.0E-08	2.0E-07
4TC	0.	1.4E-08	1.4E-08	1.4E-08	1.4E-08	1.4E-08	1.4E-08	1.4E-08	1.6E-08	2.9E-08	7.6E-08
5GC	0.	3.4E-08	3.4E-08	3.4E-08	3.4E-08	3.5E-08	3.7E-08	4.3E-08	7.9E-08	2.1E-07	6.0E-07
5TC	0.	2.0E-08	2.0E-08	2.0E-08	2.0E-08	2.0E-08	2.0E-08	[illegible]	2.1E-08	2.5E-08	3.7E-08
6GC	0.	3.7E-08	3.7E-08	3.7E-08	3.7E-08	3.7E-08	3.7E-08	4.0E-08	6.6E-08	1.3E-07	3.3E-07
6TC	0.	3.4E-08	3.4E-08	3.4E-08	3.4E-08	3.4E-08	3.4E-08	3.4E-08	3.6E-08	4.0E-08	5.5E-08
7GC	0.	4.0E-08	4.0E-08	4.0E-08	4.0E-08	4.0E-08	4.0E-08	4.0E-08	4.0E-08	4.0E-08	4.0E-08
7TC	0.	4.9E-08	4.9E-08	4.9E-08	4.9E-08	4.9E-08	4.9E-08	4.9E-08	4.9E-08	4.9E-08	4.9E-08
LPC	0.	2.9E-07	2.9E-07	2.9E-07	2.9E-07	2.9E-07	2.9E-07	3.1E-07	4.0E-07	7.3E-07	1.8E-06
UNIT	0.	9.1E-07	9.1E-07	9.1E-07	9.1E-07	9.2E-07	9.3E-07	9.7E-07	1.3E-06	2.6E-06	6.8E-06

NOTE: 1. 'ITA' WHEEL IDENTIFICATION REFERS TO FIRST TURBINE END WHEEL OF LP 'A' ROTOR
2. 'SERV TIME' 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: PHILADELPHIA ELECTRIC
STATION: LIMERICK #2
TB.NO./ROTOR: 170X464 - LPC
REVISION 3
WITHOUT PREWARMING

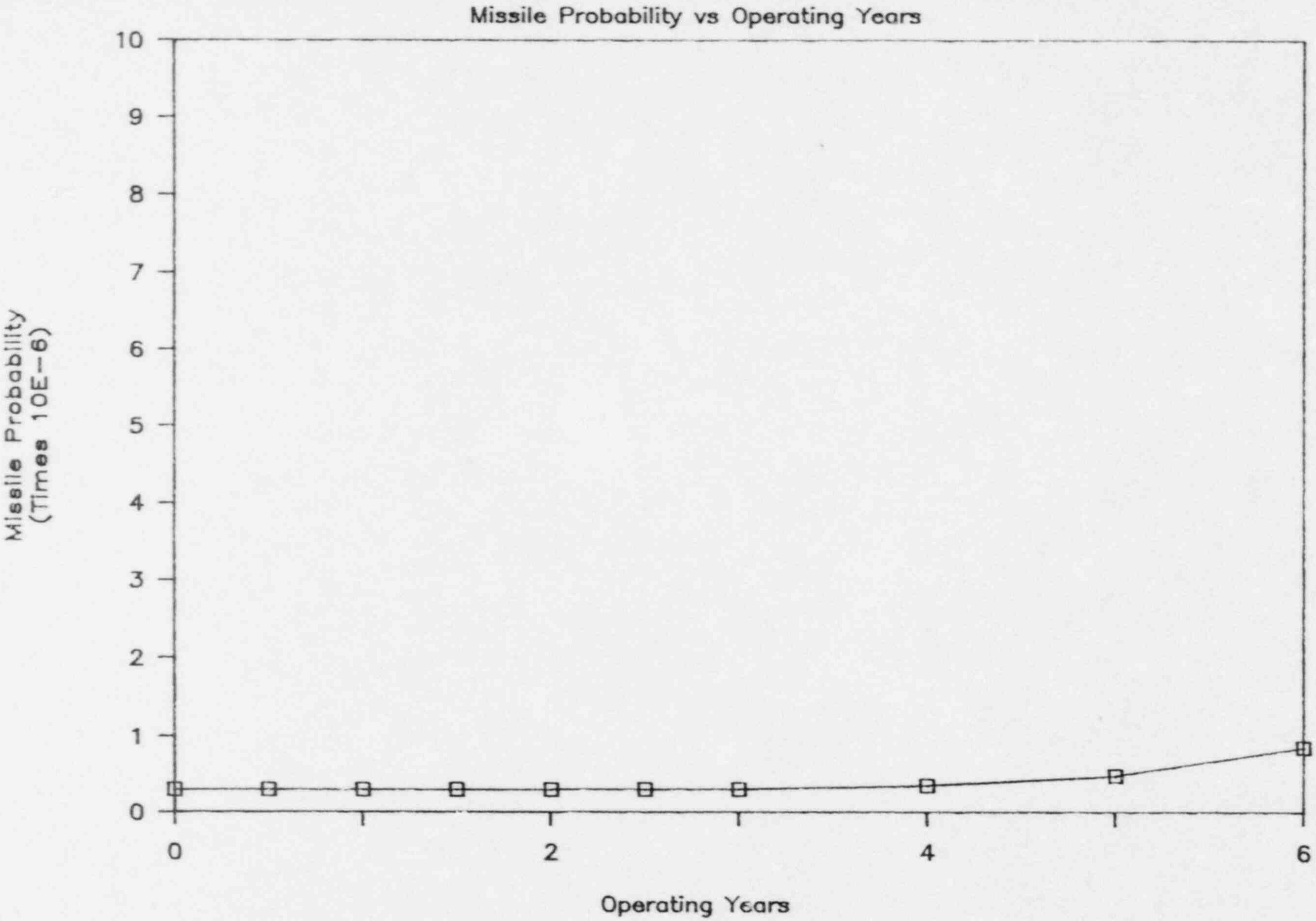
TABLE IVC
SUMMARY OF PROBABILITY INFORMATION FOR TOTAL ROTOR

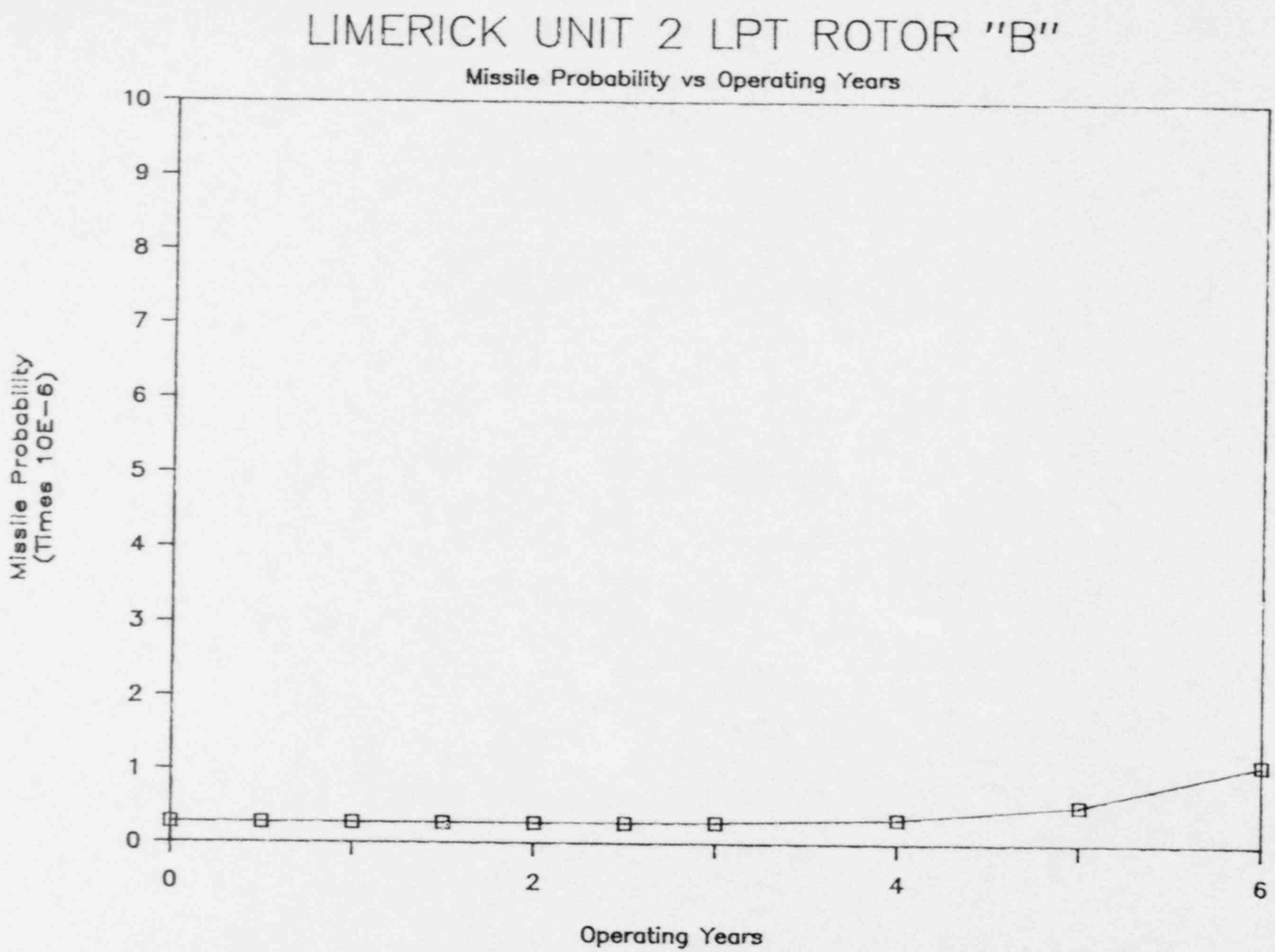
03/27/86

RTR ID	WHL ID	INSP DATE	SERV TIME	IND SIZE	YEARS TO P(MISSILE) 3E-6	5E-6	1E-5	1E-4	YEARS TO P(BURST) 1E-5	1E-4	1E-3	1E-2	YEARS TO A>2.5 * 1E-3	1E-2	1E-1	5E-1
LPC	1GC		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+
	1TC		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+
	2GC		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+
	2TC		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+
	3GC		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+
	3TC		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+
	4GC		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+
	4TC		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+
	5GC		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+
	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+
	6GC		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+
	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+
	7GC		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+
	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+
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+
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+

NOTE: 1. 'SERV TIME' 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 LATEST INSPECTION, REQUIRED TO REACH THE INDICATED LEVEL OF MISSILE PROBABILITY (E.G. '3E-6'); SIMILIARLY FOR P(BURST)
3. 'YEARS TO A>2.5' REFERS TO THE ADD'L SERVICE TIME (YEARS) REQUIRED TO REACH A SITUATION WHERE THE PROBABILITY OF HAVING A CRACK DEPTH GREATER THAN 2.5 INCHES 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+'
5. '*' SEE TEXT FOR DISCUSSION ON LIMITATIONS

LIMERICK UNIT 2 LPT ROTOR "A"




LIMERICK UNIT 2 LPT ROTOR "B"
Missile Probability vs Operating Years
Missile Probability
(Times 10E-6)
10
9
8
7
6
5
4
3
2
1
0
0
2
4
6
Operating Years

LIMERICK UNIT 2 LPT ROTOR "C"

Missile Probability vs Operating Years