

# REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

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 KNIGHT,G. Licensing Branch 3

SUBJECT: "Auxiliary Feedpumps Endurance Testing per SER (NUREG-0857).  
 W/830901 ltr.

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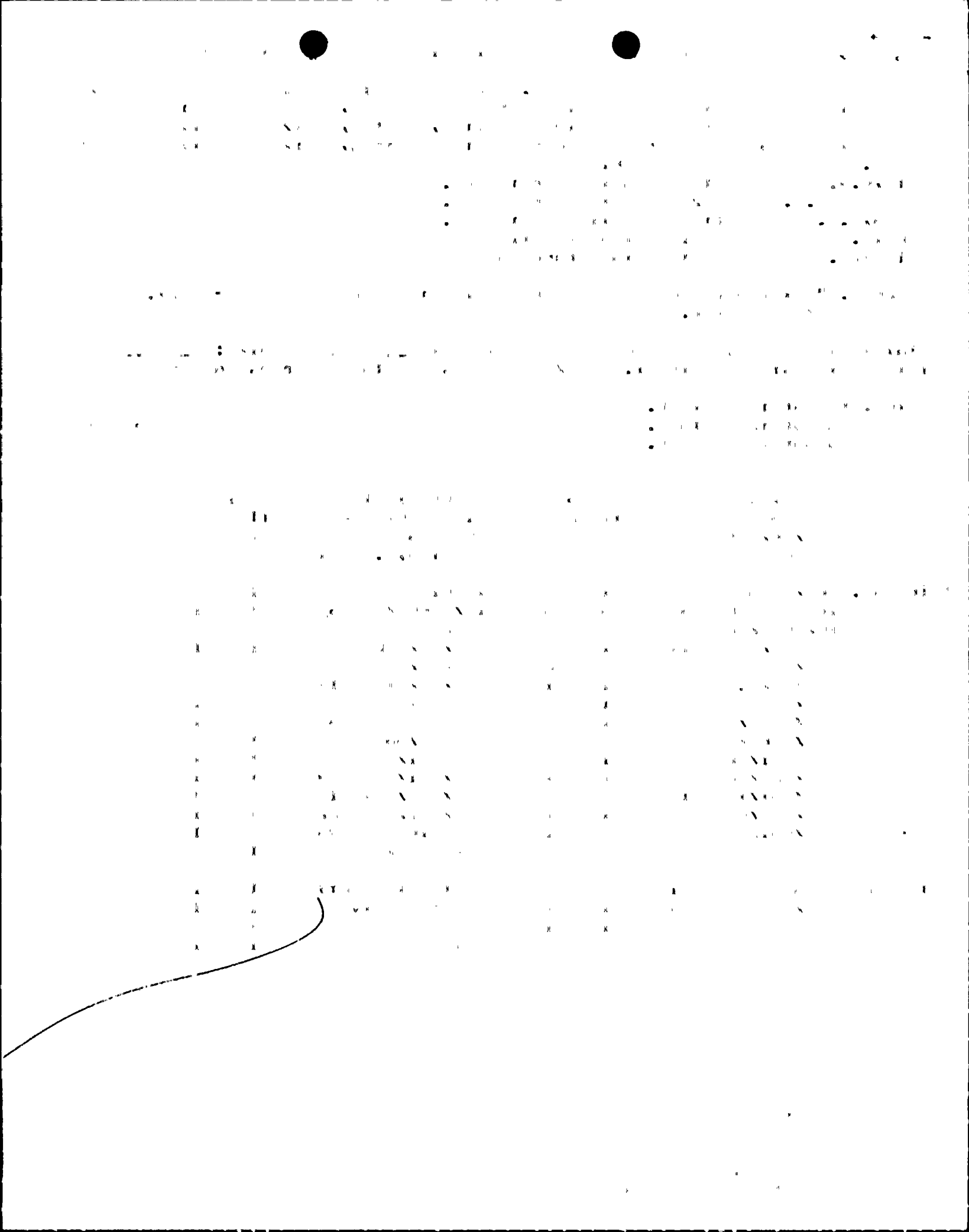
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ARIZONA



PUBLIC SERVICE COMPANY

PVNGS-JDH-M83-20

DATE: July 28, 1983

TO: Rick Ferguson  
Sta. # 6225

Prepared by:	<u>C.J. Rath</u>	<u>7/28/83</u>
	C.J. Rath	Date
Reviewed by:	<u>P.L. Brandjes</u>	<u>7/28/83</u>
	P.L. Brandjes	Date
Approved by:	<u>J.D. Hayes</u>	<u>7/28/83</u>
	J.D. Hayes	Date

SUBJECT: Auxiliary Feedpumps Endurance Testing

File: 83-019/419

Ref: (a) ANPP-18076-JMA/FTQ

Endurance testing of the three Auxiliary Feedwater Pumps was performed in accordance with Preoperational Test Procedure 91PE-1AF01 AUXILIARY FEEDWATER SYSTEM. The following test data and information is submitted for review and submittal to the Nuclear Regulatory Commission as required by reference (a).

1. Non-essential Auxiliary Feedwater Pump 1MAFN-P01 endurance testing was performed from 4/11/83 thru 4/14/83. The pump was operated at 1525-1630 psig discharge pressure with 135 gpm minimum flow recirculation to the condensate storage tank.
2. Essential Service Motor Driven Auxiliary Feedwater Pump 1MAFB-P01 endurance testing was performed from 5/5/83 thru 5/7/83. The pump was operated at 1500-1550 psig discharge pressure with 900-930 gpm test flow recirculation to the condensate storage tank.
3. Essential Service Turbine Driven Auxiliary Feedwater Pump 1MAFA-P01 endurance testing was performed from 6/30/83 thru 7/2/83. The pump was operated at various combinations of shaft speed, discharge pressure and flowrate as required to support Pre-core Hot Functional Testing. Steam pressure at the inlet of the turbine drive ranged from 150 to 1150 psig. Pump discharge pressure varied from 780 to 1580 psig and flowrate from 135 to an estimated 500 gpm.
4. Initial ambient data was recorded prior to pump starts and operating data was recorded at regular intervals during the 48 hour period. Ambient conditions were recorded prior to the pump restarts and operating data was recorded after one hour.

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5. Pump and driver bearing temperatures were recorded using permanent plant instrumentation, (AFN-P01 via AFN-TE-79, 81, 89 and 90; AFB-P01 via AFB-TE-80, 82, 86 and 87; AFA-P01 via AFA-TE-59, 60, 83 and 84). Test data is shown on attachments I-1 thru I-12. Results indicate that the bearing temperatures on all three pumps remained within the 200°F design limit specified by the manufacturer.
6. Pump room ambient wet-bulb and dry-bulb temperatures were recorded using a calibrated hand-held psychrometer. Test data is shown on attachments II-1 and II-2. The chiller systems were run intermittently during the endurance tests depending on the system's availability and the plant status during Pre-core Hot Functional Testing. The test results indicate that the installed HVAC equipment is capable of maintaining ambient conditions within the environmental limit of 104°F for safety related equipment in the room. This conclusion is supported by the results of additional testing performed in accordance with Pre-core Hot Functional Test Procedure 91HF-1HA01 ESF PUMP ROOM HVAC PERFORMANCE TEST.
7. Pump inboard and outboard bearing vibration was measured using a calibrated hand-held vibration meter (IRD Model 810). Test data is summarized below:

	<u>Inboard Bearing Vibration (mils)</u>	<u>Outboard Bearing Vibration (mils)</u>
Pump 1MAFA-P01	0.2 - 0.6	0.2 - 0.7
Pump 1MAFB-P01	0.8 - 1.2	1.0 - 1.3
Pump 1MAFN-P01	0.4 - 0.6	0.6 - 0.9

The results indicate that bearing vibration on all three pumps remained within the manufacturer's 2.5 mil displacement limit during the endurance test.

In conclusion, the 48 hour endurance run test data demonstrated that the pumps remain within design limits with respect to bearing temperatures and vibration, and for the two (2) essential AFW system pumps that the pump room ambient conditions do not exceed environmental qualification limits for safety-related equipment in the room.

amd

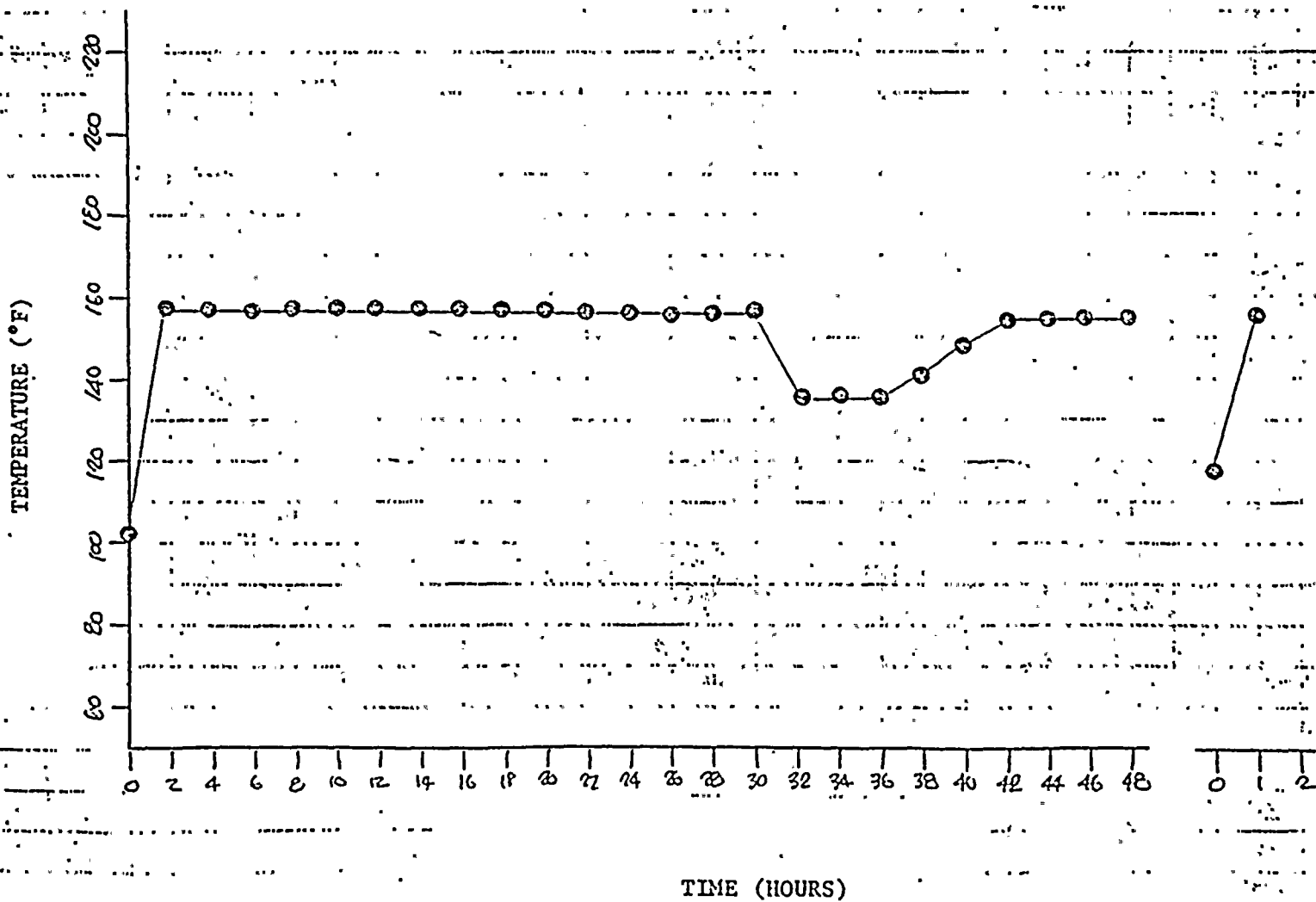
Attachments



48 HOUR ENDURANCE TEST RESULTS

ESSENTIAL SERVICE TURBINE  
DRIVEN PUMP 1MAFA-PO1

PUMP INBOARD BEARING TEMPERATURE  
VS TIME



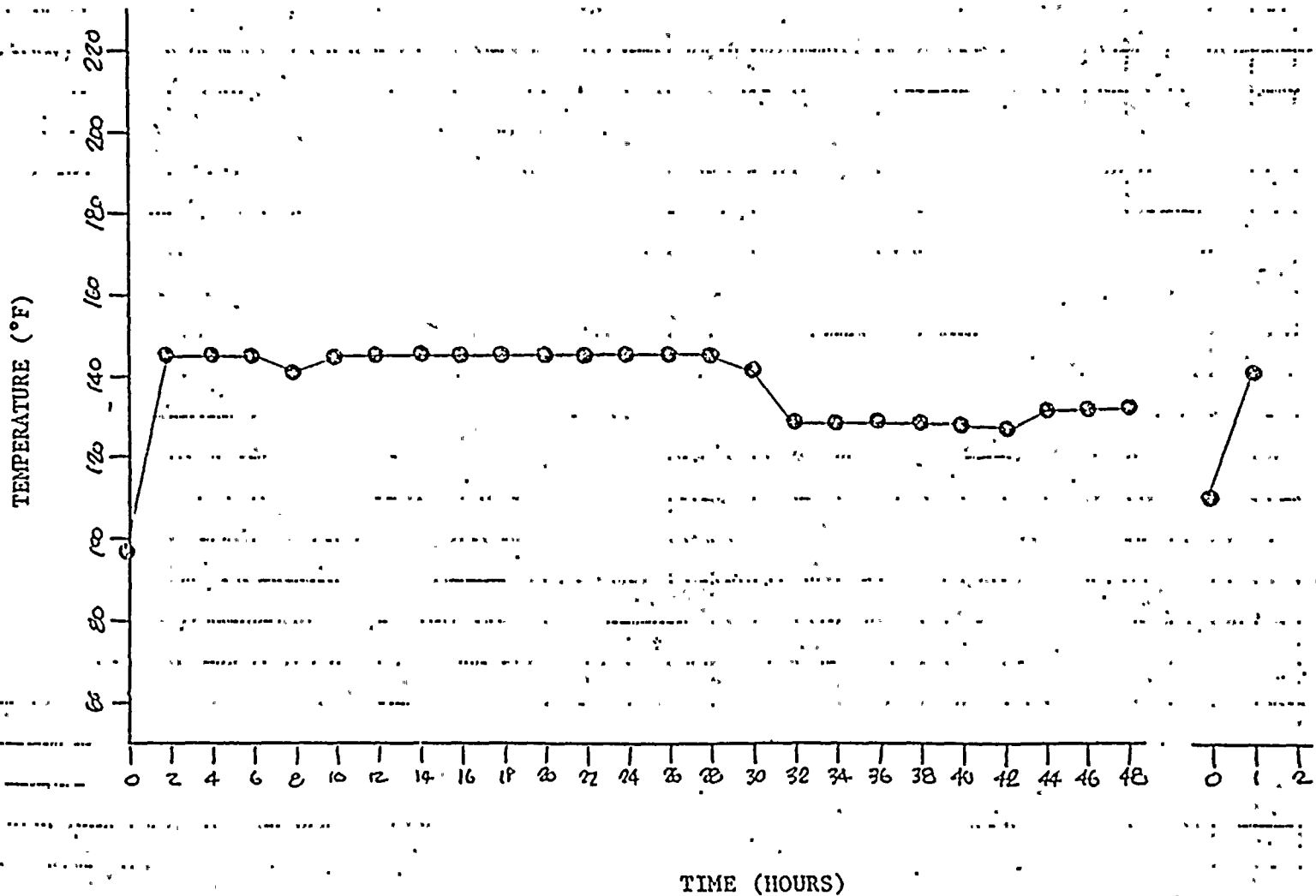




48 HOUR ENDURANCE TEST RESULTS

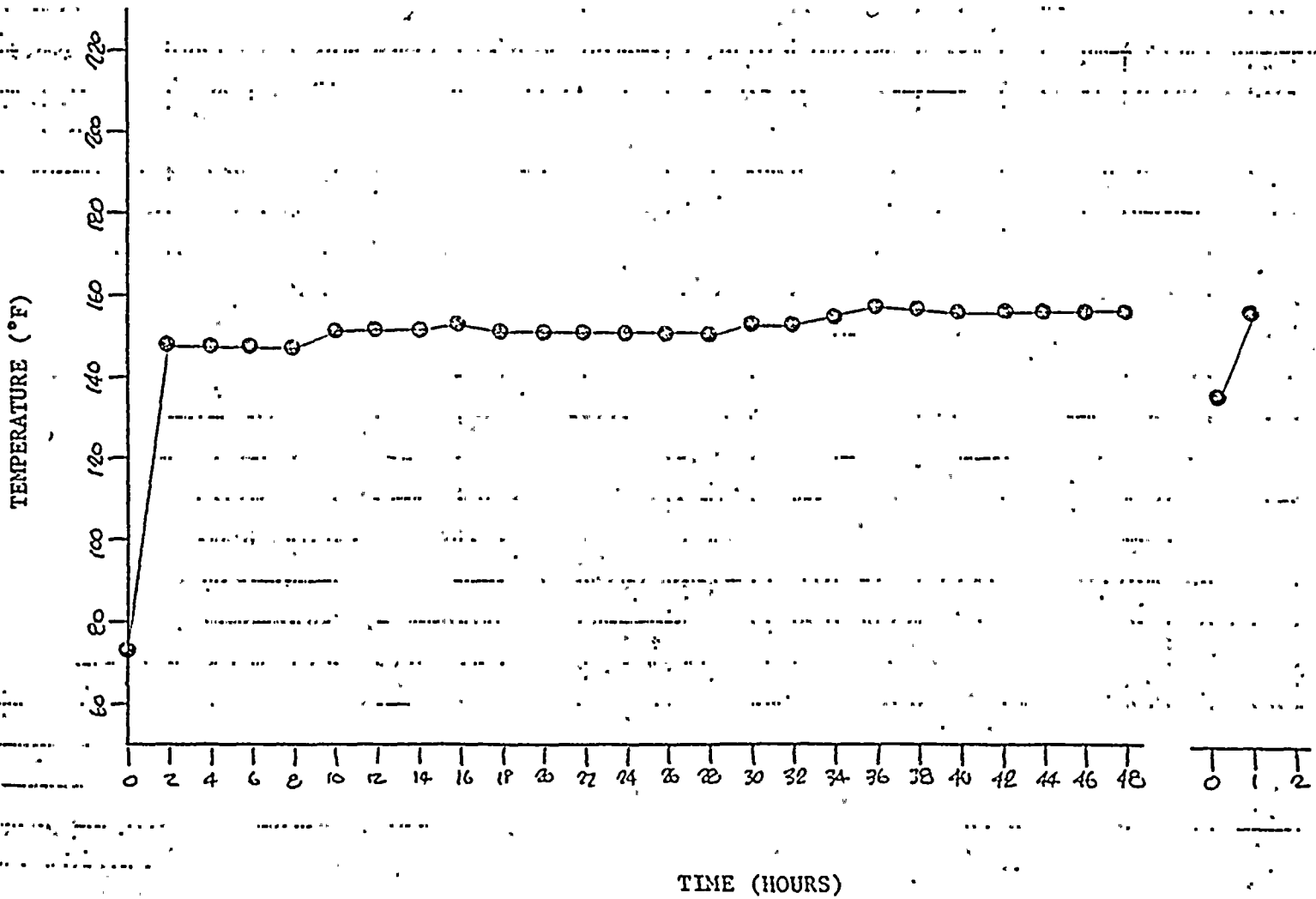
ESSENTIAL SERVICE TURBINE  
DRIVEN PUMP 1MAFA-PO1

PUMP OUTBOARD BEARING TEMPERATURE  
VS TIME



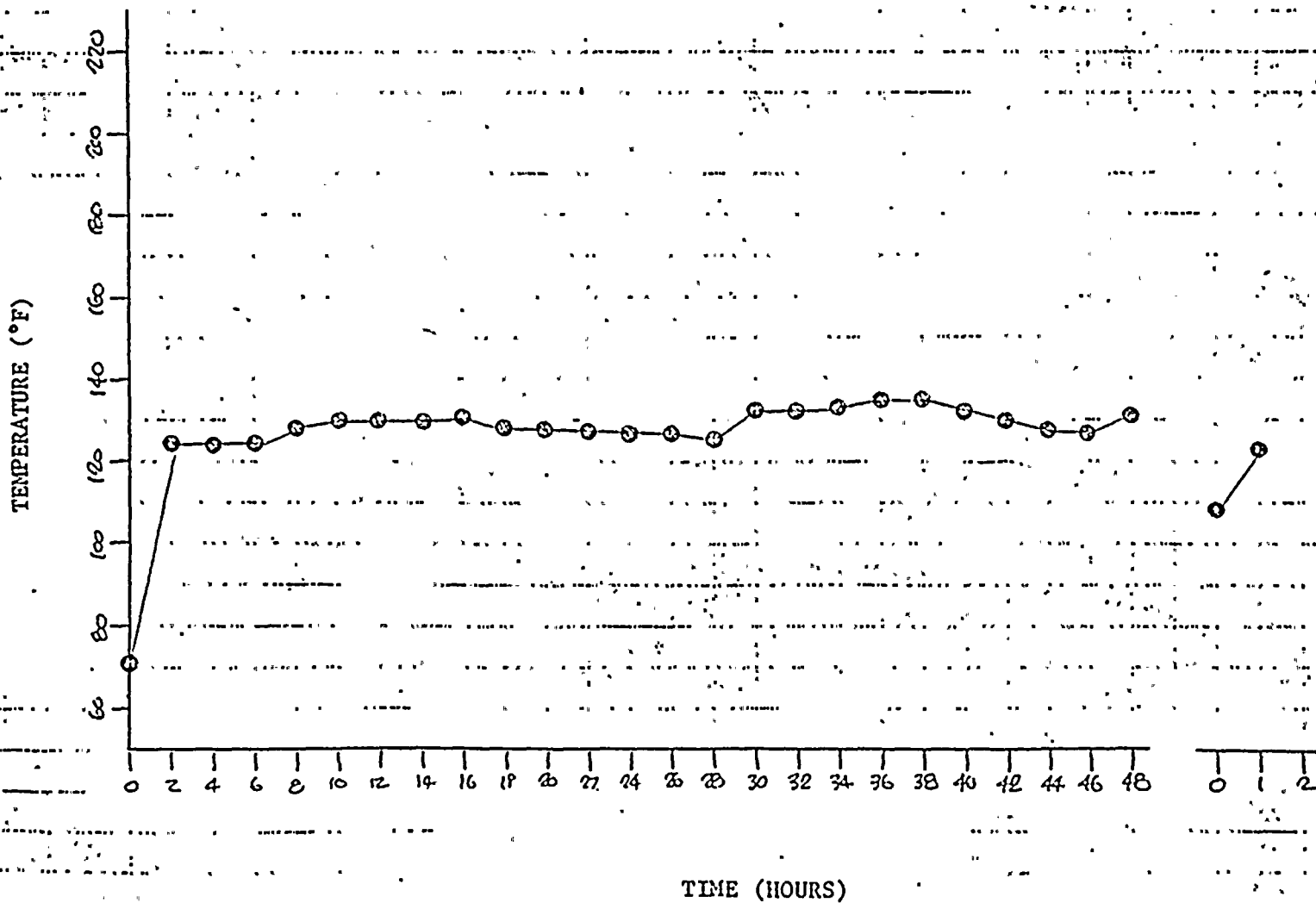


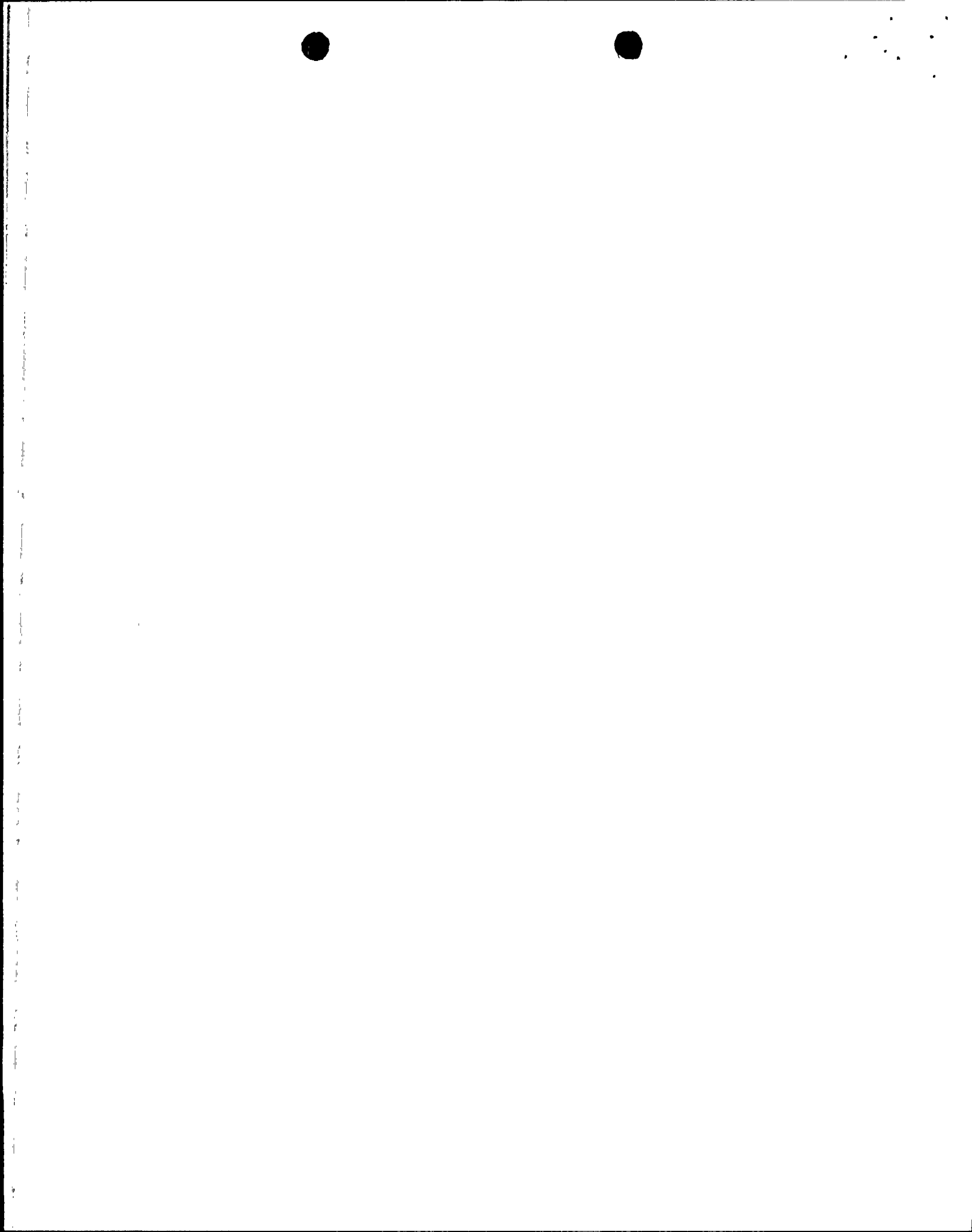
48 HOUR ENDURANCE TEST RESULTS  
ESSENTIAL SERVICE MOTOR DRIVEN  
PUMP 1MAFB-P01  
PUMP INBOARD BEARING TEMPERATURE  
VS TIME



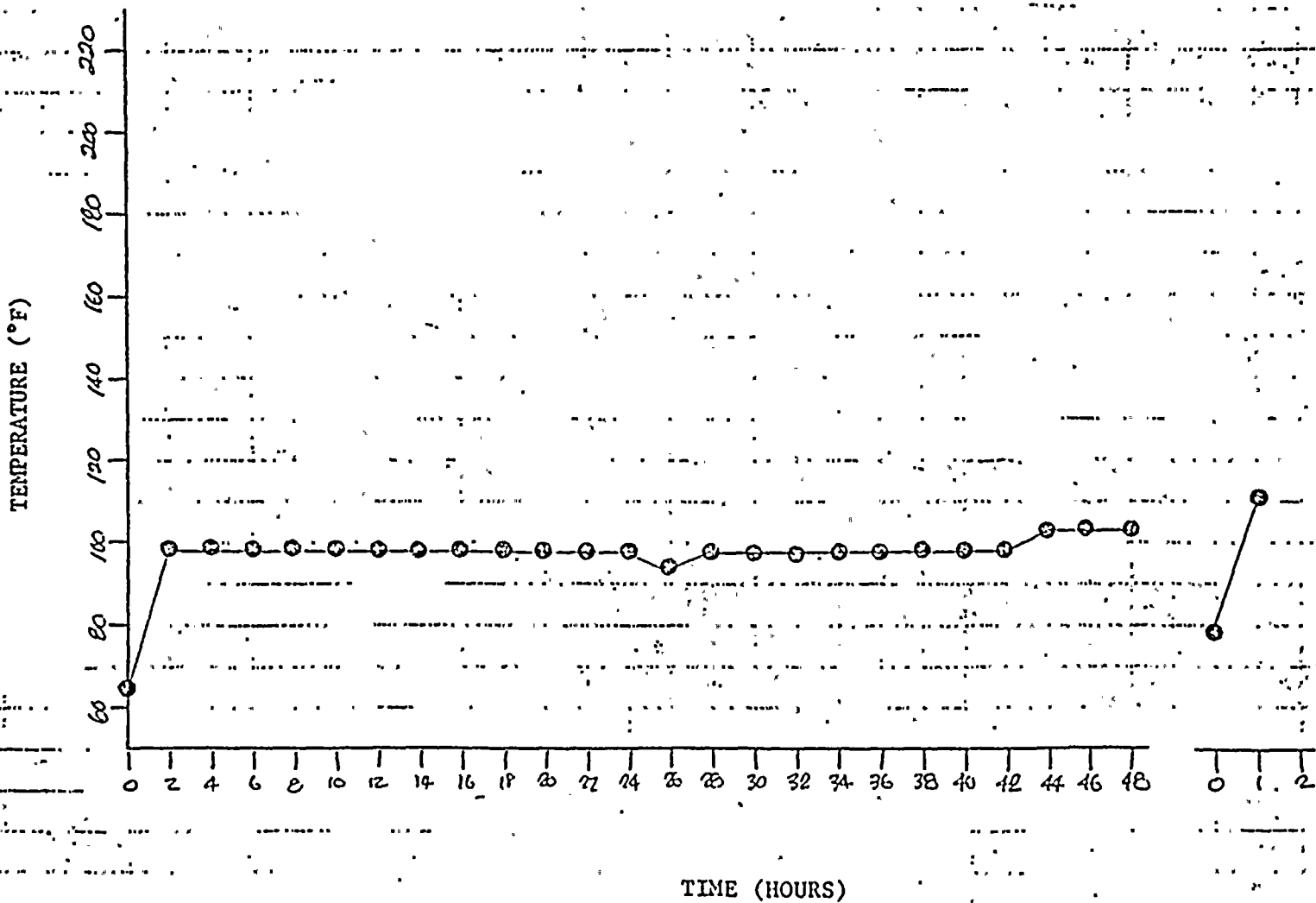


48 HOUR ENDURANCE TEST RESULTS  
 · ESSENTIAL SERVICE MOTOR DRIVEN  
 PUMP 1MAFB-PO1  
PUMP OUTBOARD BEARING TEMPERATURE  
VS TIME





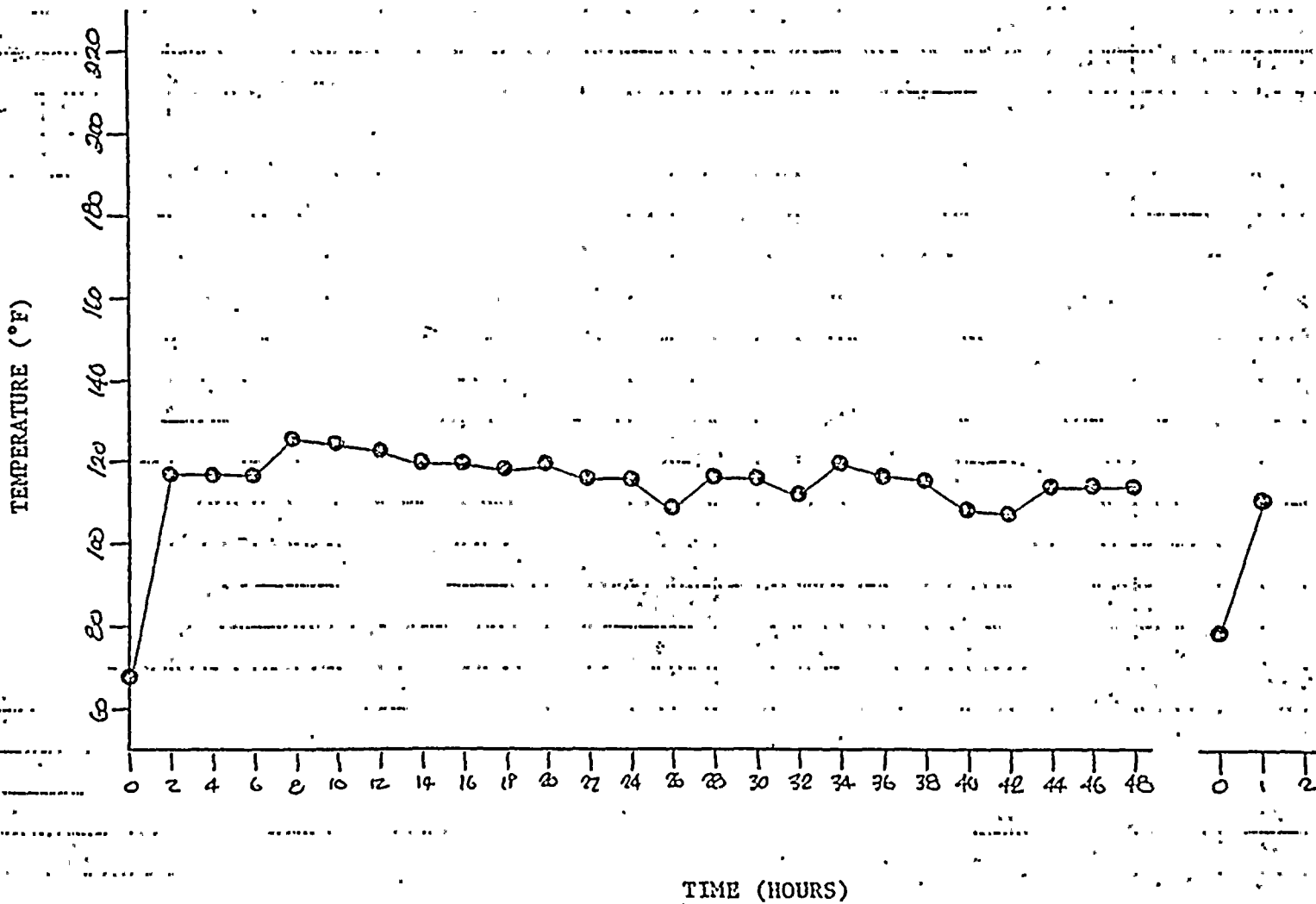
48 HOUR ENDURANCE TEST RESULTS  
 NON-ESSENTIAL SERVICE MOTOR  
 PUMP 1MAFN-PO1  
PUMP INBOARD BEARING TEMPERATURE  
VS TIME







48 HOUR ENDURANCE TEST RESULTS  
NON-ESSENTIAL SERVICE MOTOR  
PUMP 1MAFN-PO1  
PUMP OUTBOARD BEARING TEMPERATURE  
VS TIME

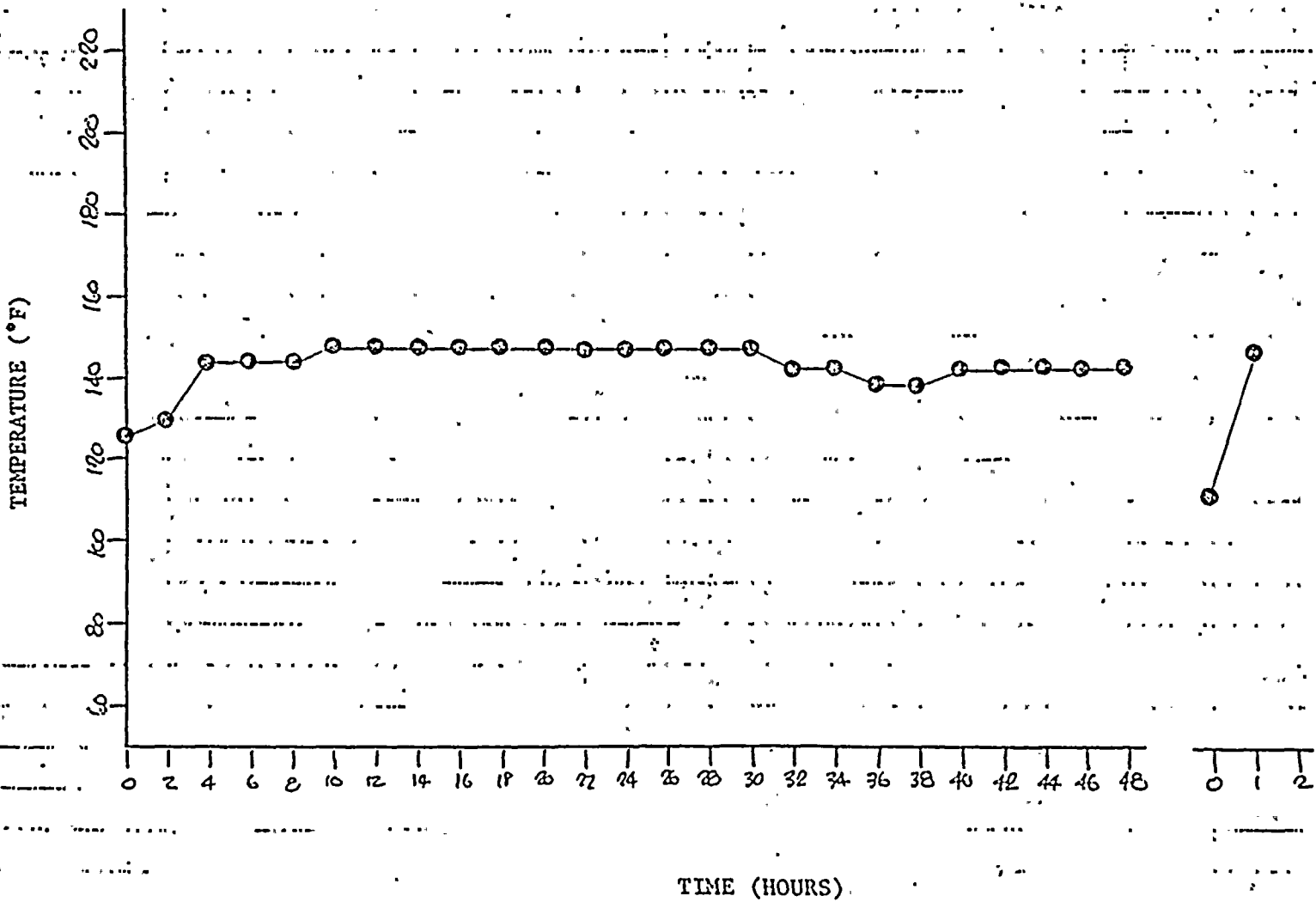




48 HOUR ENDURANCE TEST RESULTS

ESSENTIAL SERVICE TURBINE  
DRIVEN PUMP 1MAFA-P01

DRIVER INBOARD BEARING  
TEMPERATURE VS TIME

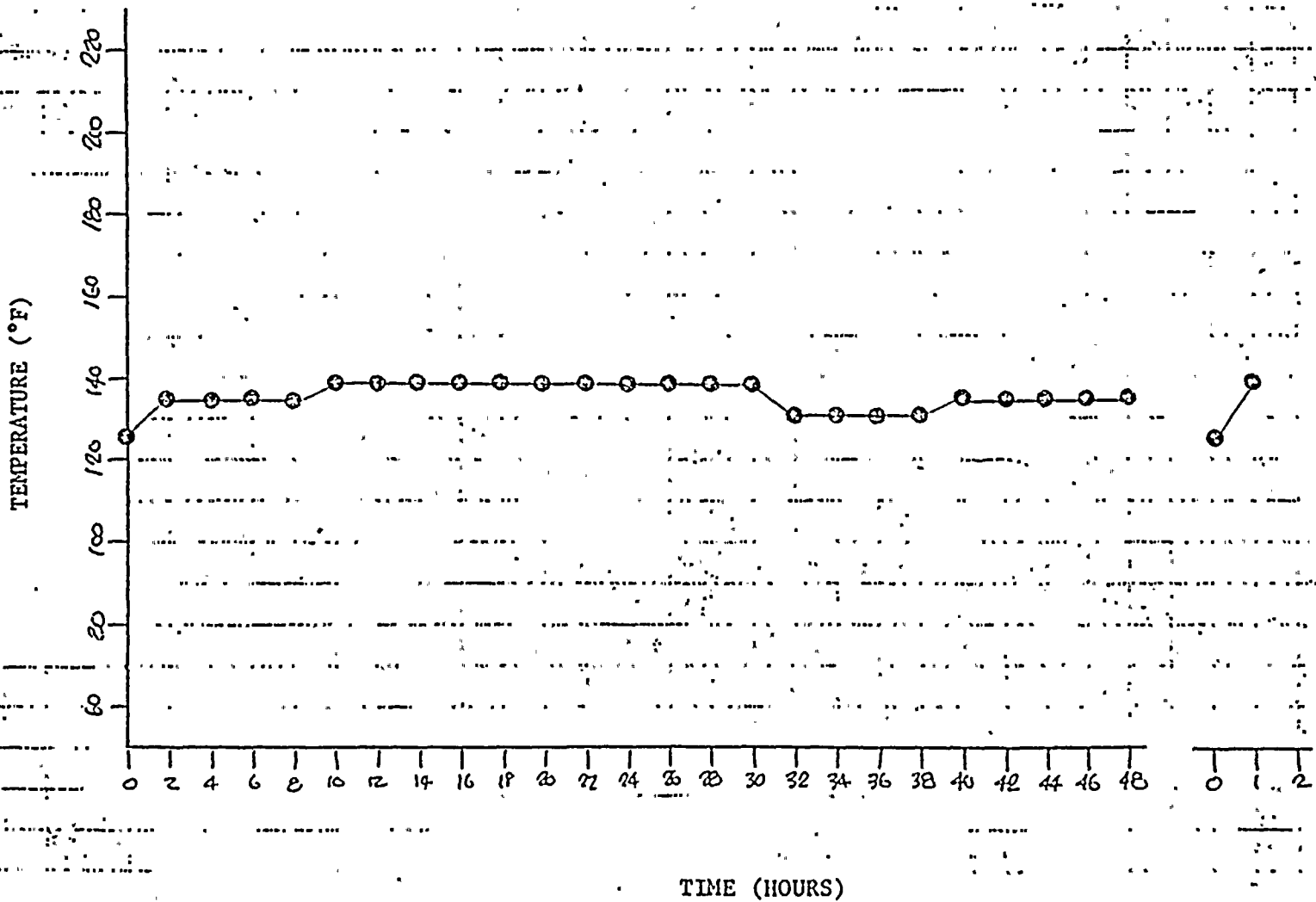




48 HOUR ENDURANCE TEST RESULTS

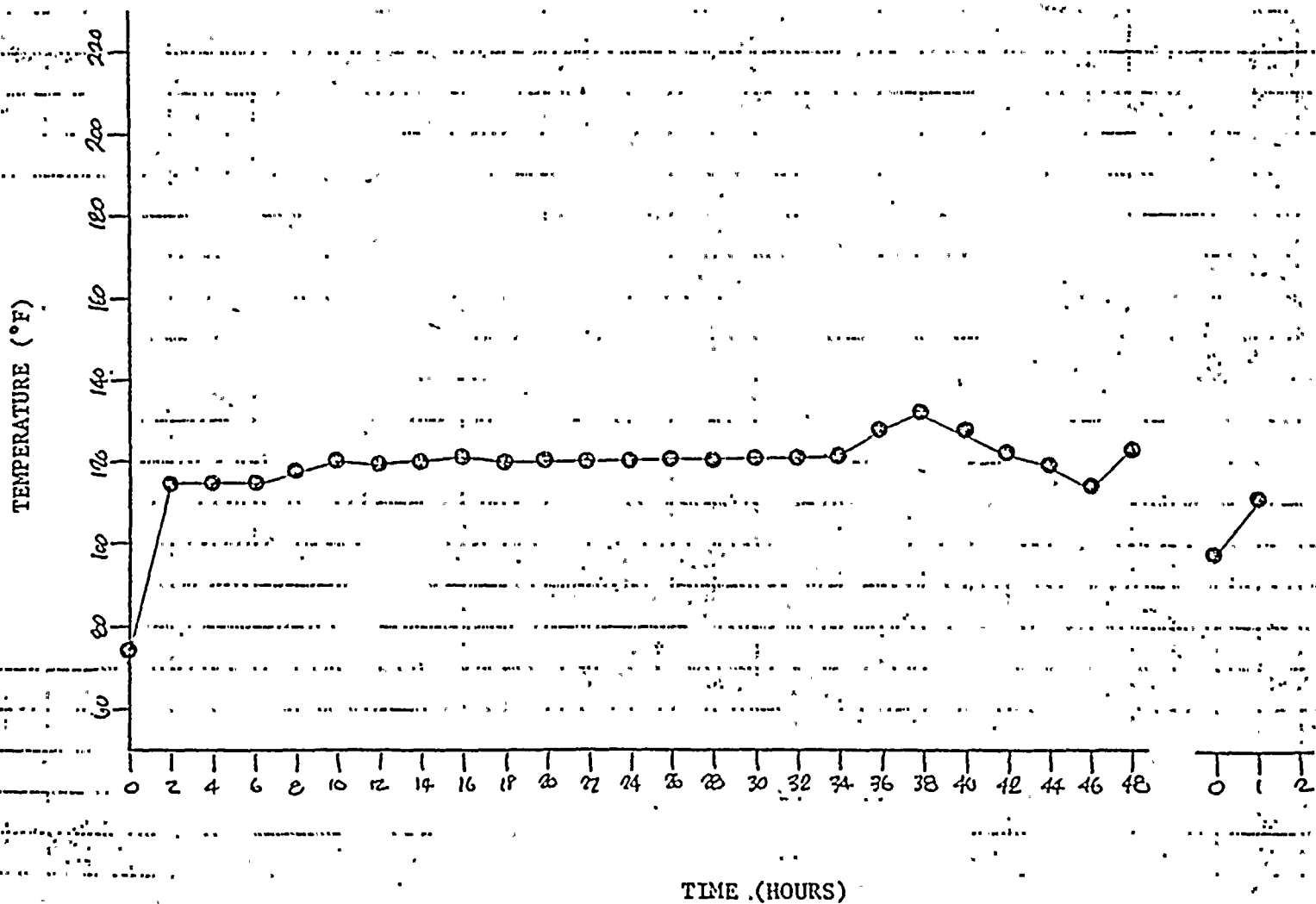
ESSENTIAL SERVICE TURBINE  
DRIVEN PUMP 1MAFA-PO1

DRIVER OUTBOARD BEARING  
TEMPERATURE VS TIME





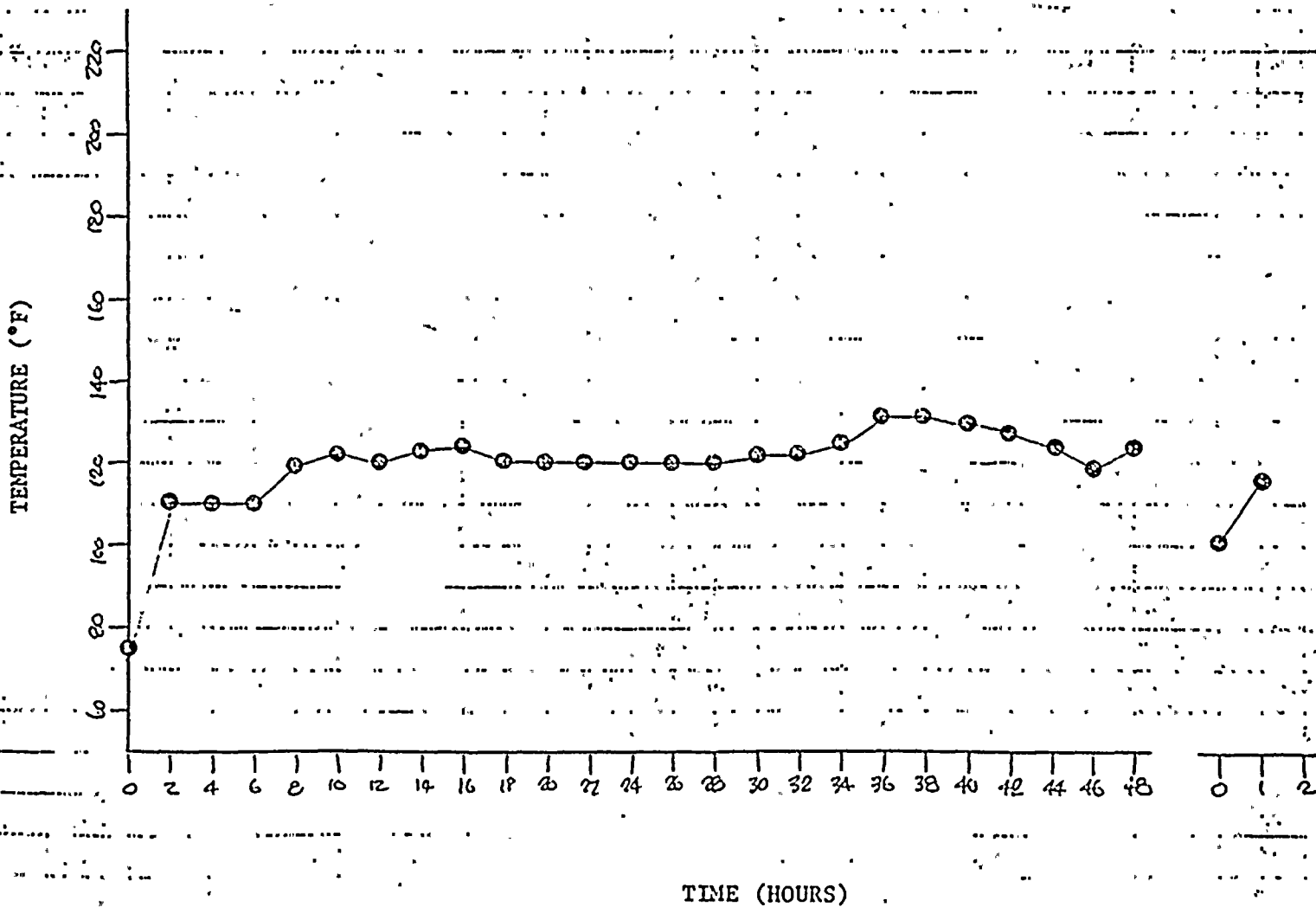
48 HOUR ENDURANCE TEST RESULTS  
ESSENTIAL SERVICE MOTOR DRIVEN  
PUMP 1MAFB-P01  
DRIVER INBOARD BEARING TEMPERATURE  
VS TIME







48 HOUR ENDURANCE TEST RESULTS  
 ESSENTIAL SERVICE MOTOR DRIVEN  
 PUMP 1MAFB-PO1  
DRIVER OUTBOARD BEARING  
TEMPERATURE VS TIME



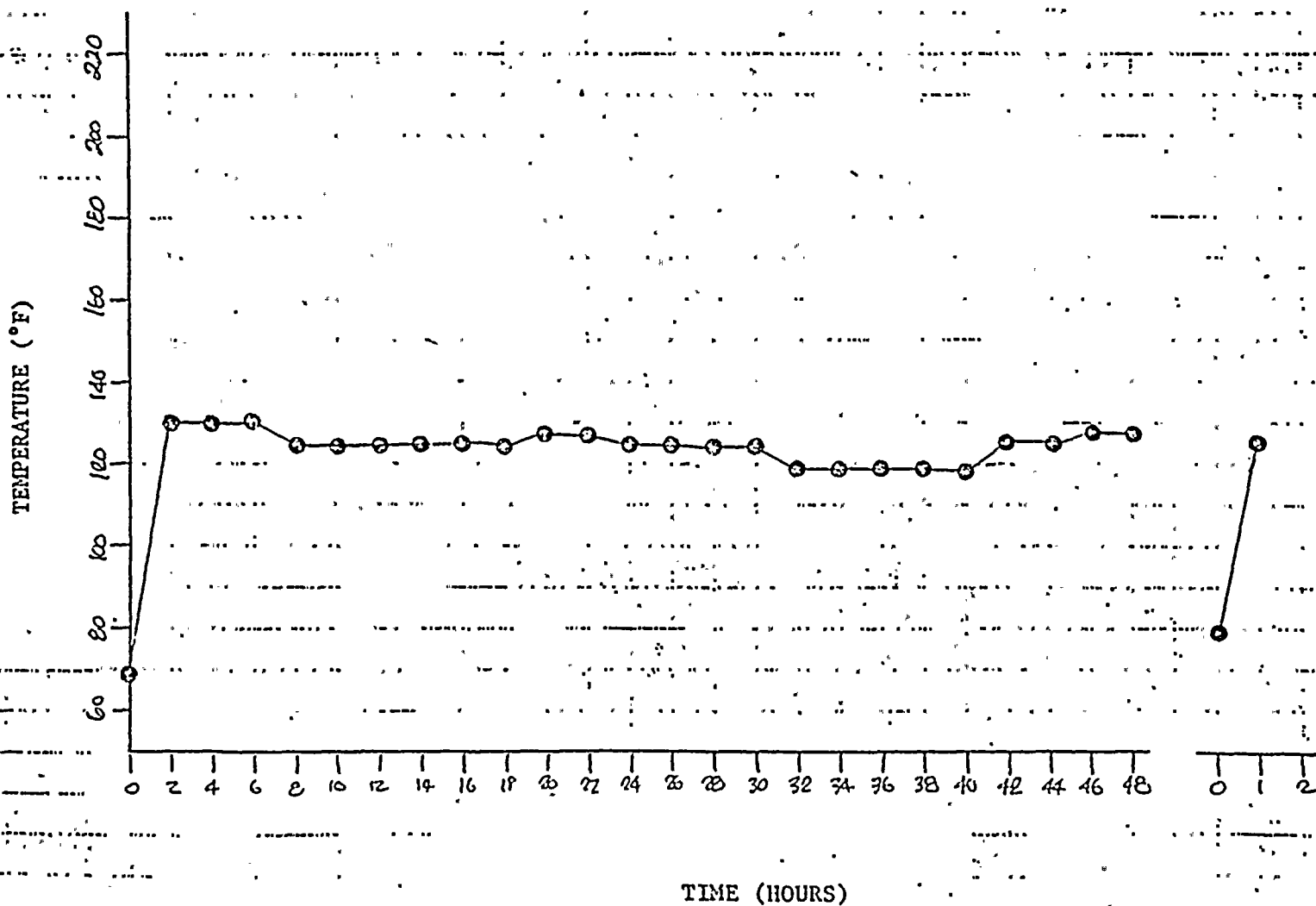


48 HOUR ENDURANCE TEST RESULTS

NON-ESSENTIAL SERVICE MOTOR  
PUMP 1MAFN-PO1

DRIVER INBOARD BEARING

TEMPERATURE VS TIME



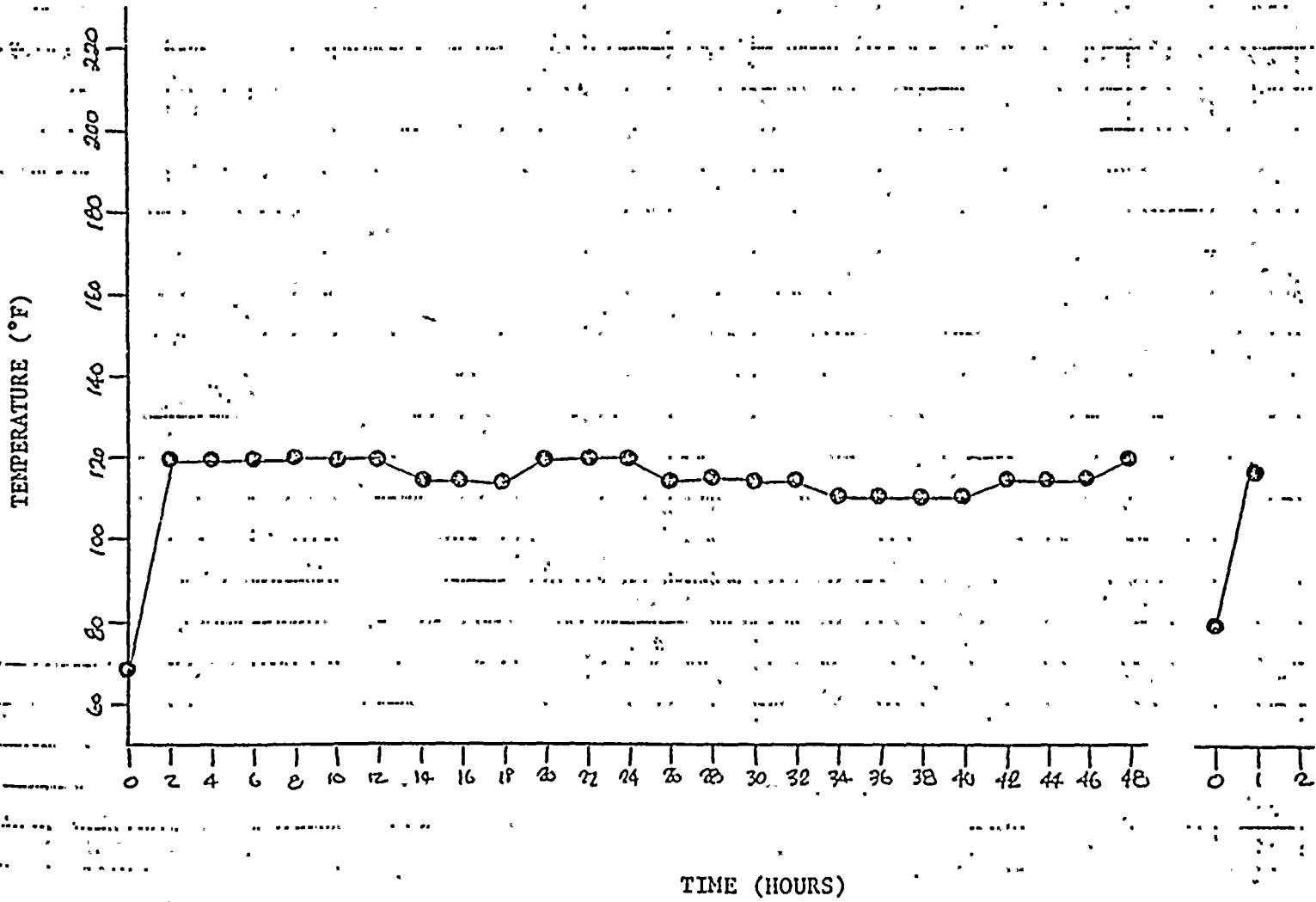


48 HOUR ENDURANCE TEST RESULTS

NON-ESSENTIAL SERVICE MOTOR  
PUMP 1MAFN-PO1

DRIVER OUTBOARD BEARING

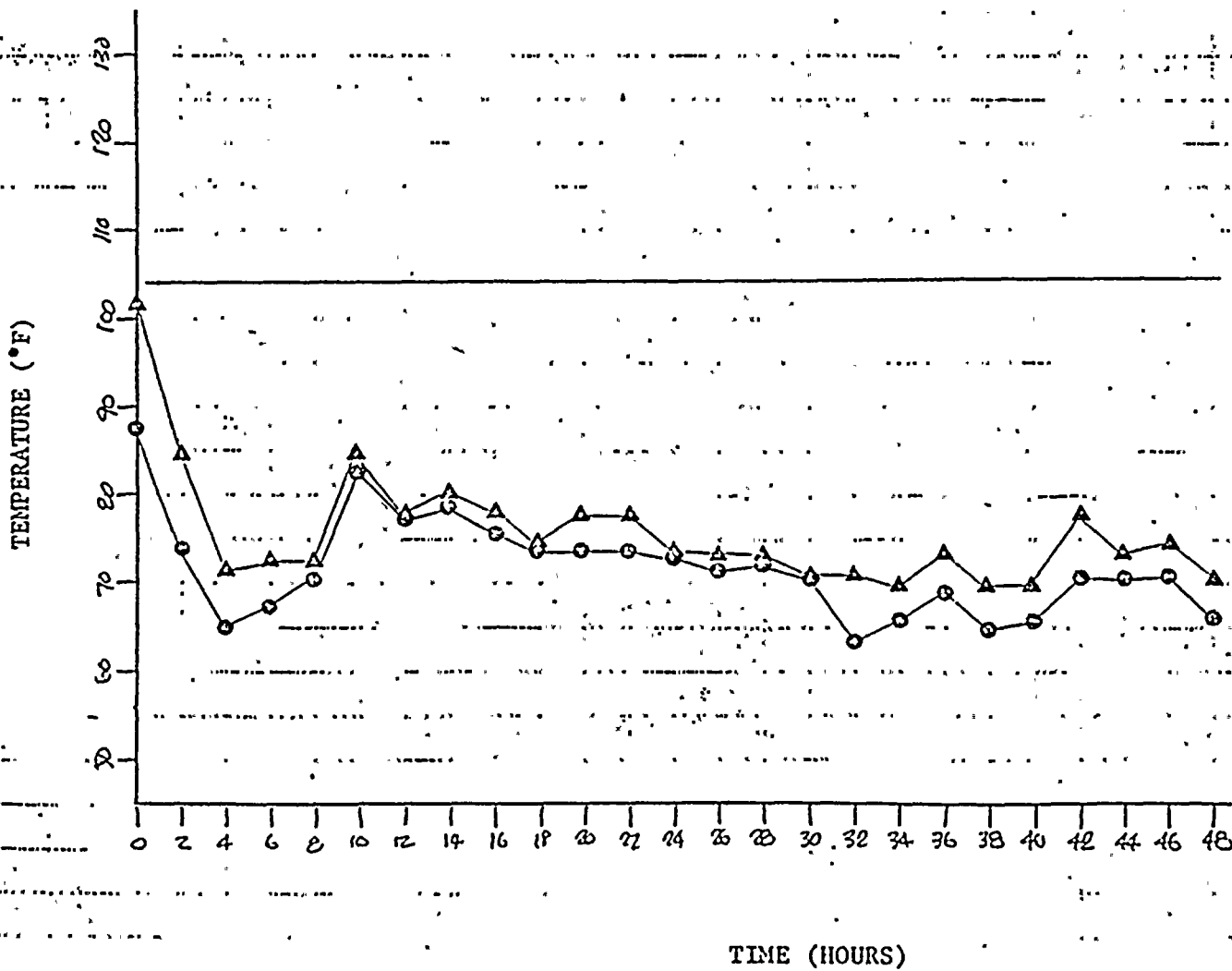
TEMPERATURE VS TIME



# 48 HOUR ENDURANCE TEST RESULTS

## ESSENTIAL SERVICE TURBINE DRIVEN PUMP ROOM TEMPERATURE

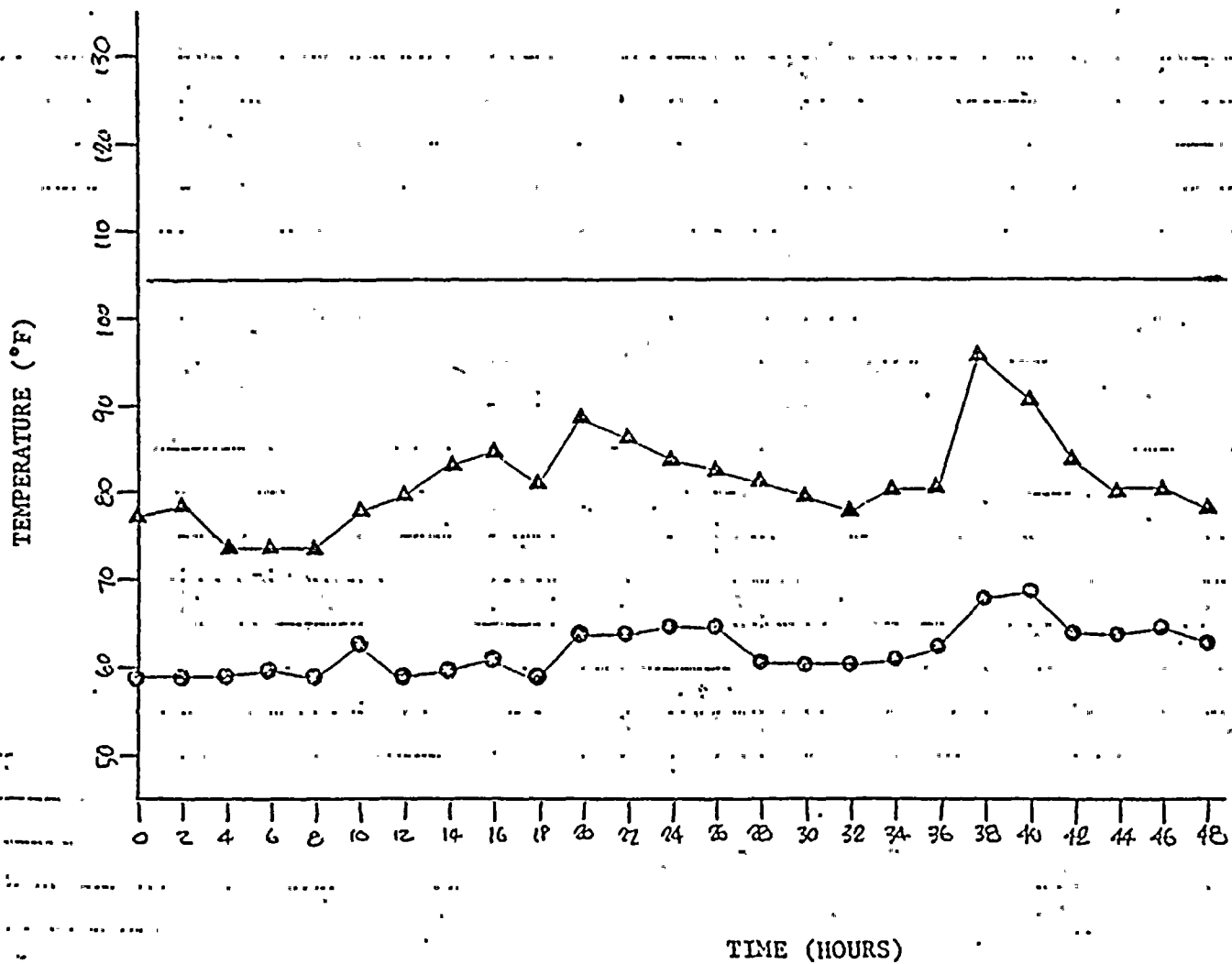
● WET BULB TEMPERATURE VS TIME  
▲ DRY BULB TEMPERATURE VS TIME



# 48 HOUR ENDURANCE TEST RESULTS

## ESSENTIAL SERVICE MOTOR DRIVEN PUMP ROOM TEMPERATURE

- WET BULB TEMPERATURE VS TIME
- ▲ DRY BULB TEMPERATURE VS TIME







Arizona Public Service Company

P.O. BOX 21666 • PHOENIX, ARIZONA 85036

September 1, 1983

ANPP-27714 - WFQ/TFQ

Director of Nuclear Reactor Regulation  
Attention: Mr. George Knighton, Chief  
Licensing Branch No. 3  
Division of Licensing  
U. S. Nuclear Regulatory Commission  
Washington, D. C. 20555

Subject: Palo Verde Nuclear Generating Station (PVNGS)  
Units 1, 2 and 3  
Docket Nos. STN-50-528/529/530  
File: 83-056-026; G.1.01.10

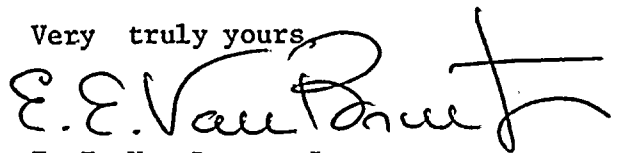
Reference: NUREG-0857, "Safety Evaluation Report related to the  
operation of the Palo Verde Nuclear Generating Station,  
Units 1, 2 and 3", dated November 1, 1981.

Dear Mr. Knighton:

In regard to your request in NUREG-0857, Section II.E.1.1, we have  
attached a copy of the PVNGS auxiliary feedwater pump endurance test  
results. These results will be included in a future amendment to the  
PVNGS TMI-2 Lessons Learned Implementation Report.

Please contact me if you have any questions on this matter.

Very truly yours,



E. E. Van Brunt, Jr.  
APS Vice President,  
Nuclear Projects  
ANPP Project Director

EEVBJr/TFQ/sp  
Attachment

cc: E. A. Licitra (w/a)  
J. S. Wermiel "  
A. C. Gehr "

Boo1  
11



September 1, 1983  
ANPP-27714 - WFQ/TFQ

STATE OF ARIZONA    )  
                          ) ss.  
COUNTY OF MARICOPA)

I, Edwin E. Van Brunt, Jr., represent that I am Vice President Nuclear Projects of Arizona Public Service Company, that the foregoing document has been signed by me on behalf of Arizona Public Service Company with full authority so to do, that I have read such document and know its contents, and that to the best of my knowledge and belief, the statements made therein are true.

Edwin E. Van Brunt, Jr.  
Edwin E. Van Brunt, Jr.

Sworn to before me this 31st day of August, 1983.

Nora E. Meador  
Notary Public

My Commission expires:

My Commission Expires April 6, 1987

