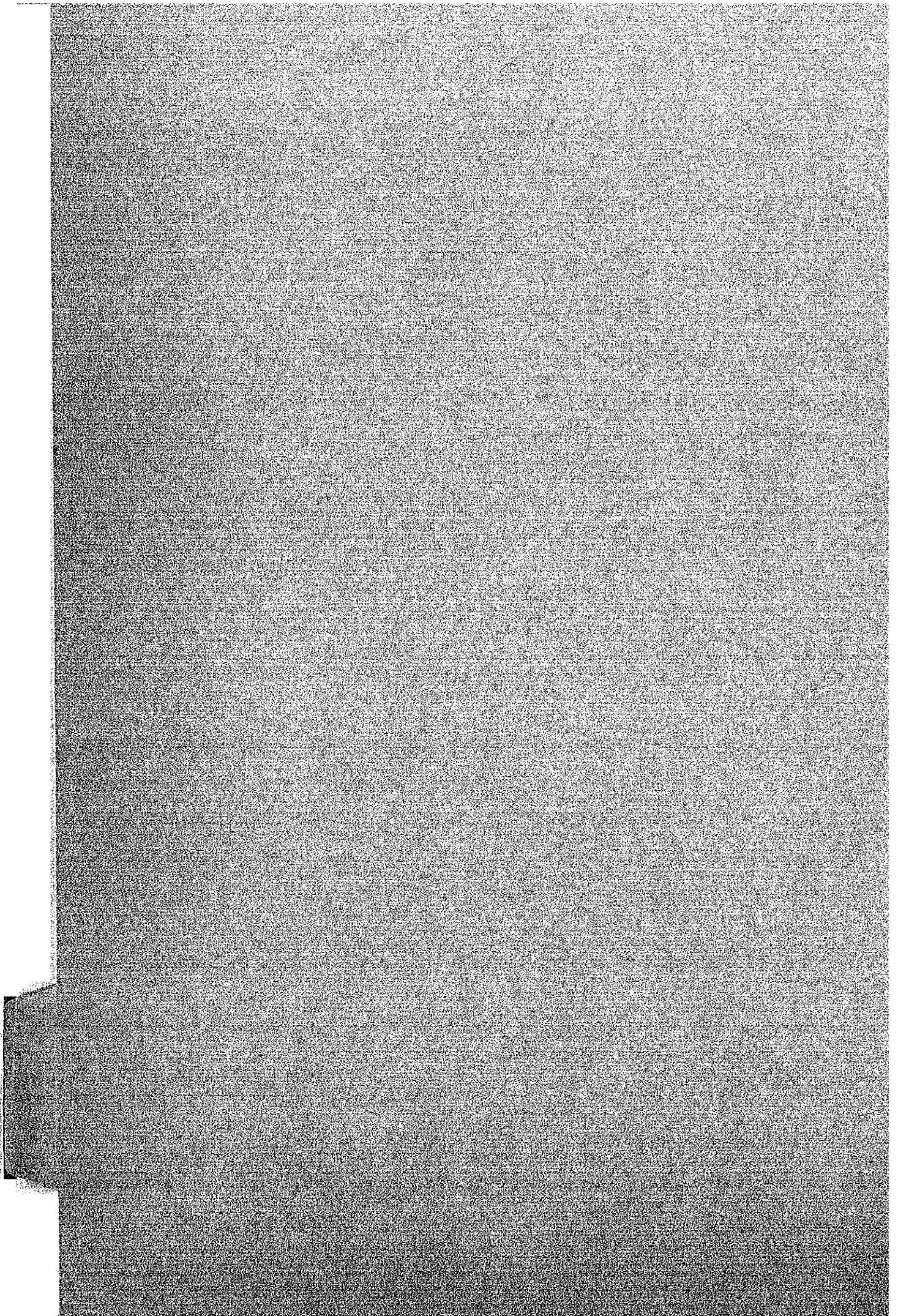
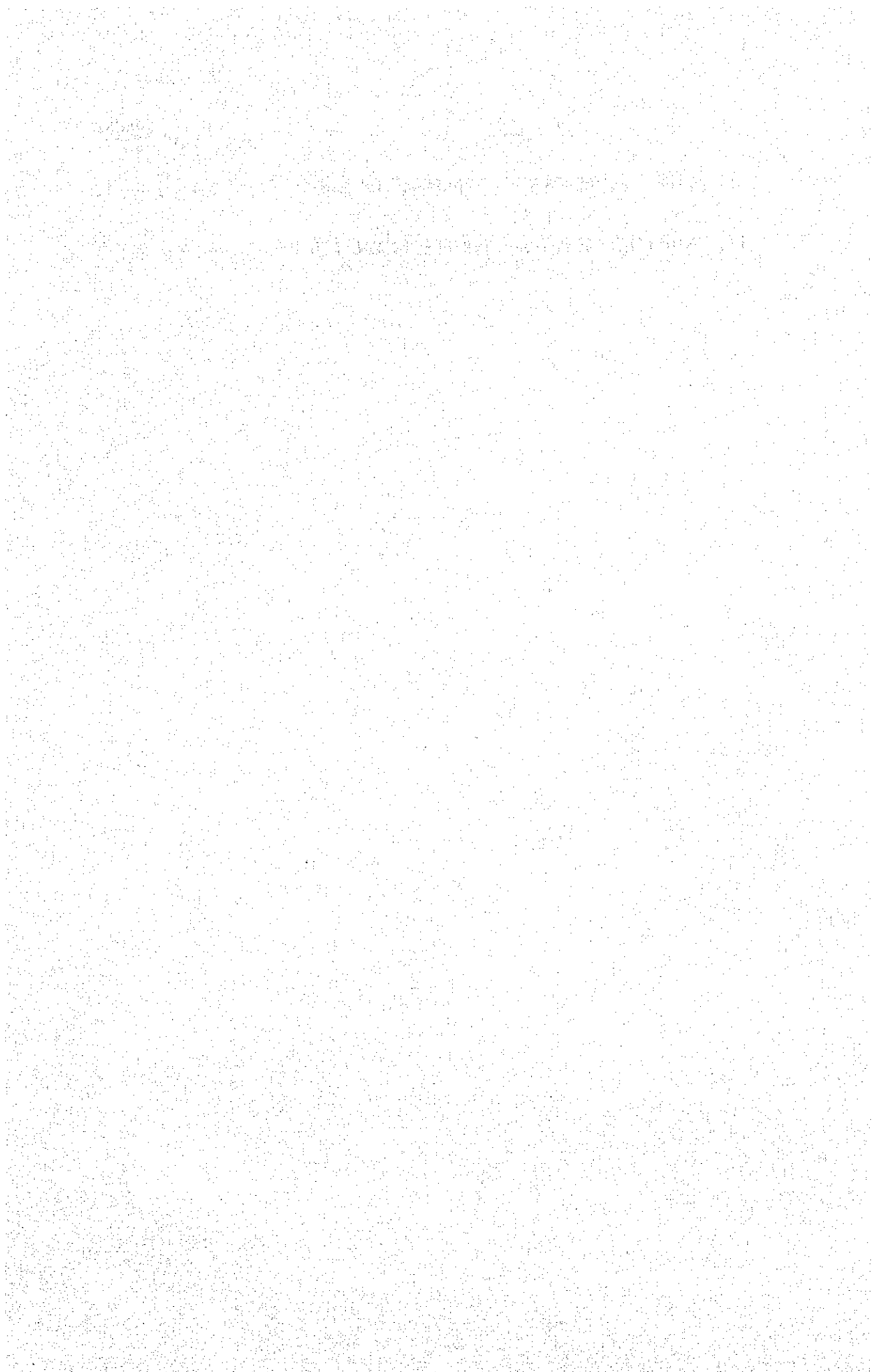


APPENDIX-15 STUDY ON THE CAPACITY INCREASE OF M-BFP OF M-1



<u>T I T L E</u>	<u>P A G E</u>
I. STUDY ON THE CAPACIT INCREASE OF M-B OF M-1 -----	1
II. STUDY FOR 50% M-BFP FOR ELECTRICAL EQUIPMENT -----	22



STUDY ON THE CAPACITY INCREASE OF M-BFP OF M-1

The following study on the improvement of existing M-BFP system was given in response to the NPC request to JICA Team to increase the said pump capacity up to 1/2 from 1/3 of the boiler capacity.

- Idea I - Improvement of the BFP operation procedure at boiler start-up if possible.
- Idea II - Replacement of boiler feed pump and its motor rated 50% of boiler capacity instead of 1/3 capacity including study on station service power and space for the installation, piping, valves, etc.
- Idea III - Relocation of 1/3 capacity BFPM from S-2 to M-1 including study on station service power and space for the installation.

Conclusion of the Study

It is concluded that no capacity increase of the pump will be required since the existing system provides sufficient performance during start-up of the plant when the operation is proceeded in proper order.

Nevertheless, if the capacity increase is required, the need of piping replacement and new installation of electrical equipment will take place.

However, the existing space will allow these new installations and modifications of the system in M-1.

It is also possible to relocate the existing M-BFP rated 1/3 boiler capacity from S-2 to M-1 but since the temperature and pressure design conditions are based on 1/3 boiler capacity, this idea only provides a stand-by unit for existing M-BFP.

Idea I

1. Problems on the Existing M-BFP

(1) Contents of study in MALAYA THERMAL POWER PLANT

- a. There will be no operating problems in case the plant facilities/and auxiliaries are maintained in good and efficient operating conditions.

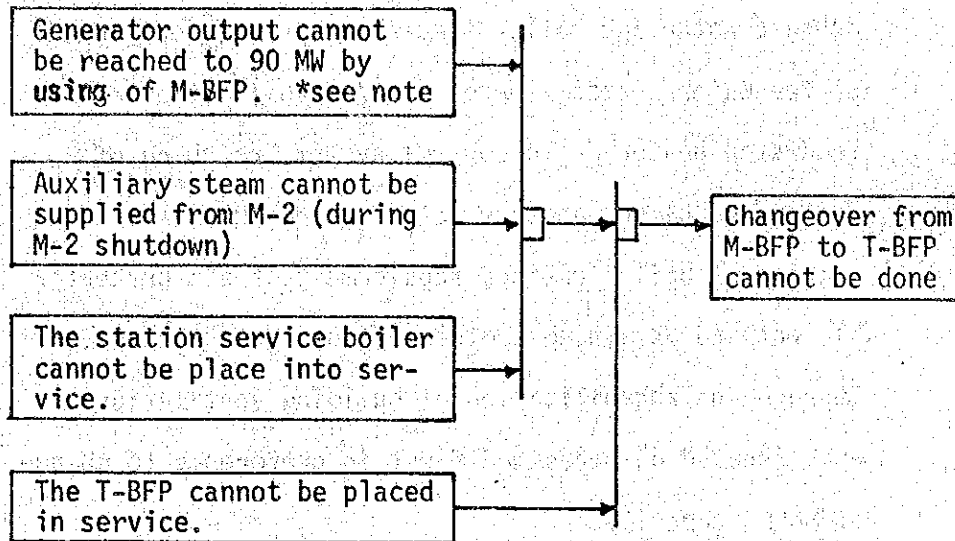
Usually, T-BFP is driven by CRH steam and is changed over from M-BFP at 80 - 100 MW.

In case that the motor driven BFP cannot be placed in service, the plant can be started by T-BFP driven by auxiliary steam from M-2 or the auxiliary boiler steam.

- b. There are some cases wherein the T-BFP cannot be placed in service due to abnormal condition of the plant auxiliary. However, these cases are rare.

One such case is when the M-BFP cannot be changed over to T-BFP

For example:



\* The case when the generator output cannot reach 90 MW by the use of the M-BFP means abnormal conditions of power plant auxiliaries such as feedwater system or steam system deficiencies. In this case, it is not desirable to continue plant operation.

- c. If the capacity of the M-BFP is changed from 1/3 to 1/2 of MCR, steam conditions for T-BFP will be increased and in the case of T-BFP failure, 50% (150 MW) output of generator could be obtained.
- d. According to the result of the survey of M-1 unit, there are many things to be done prior to changing the M-BFP capacity to 50%.

Installation of chlorination equipment, purchase spare condenser tubes, installation of chloride detecting equipment, perfection of monitoring equipment for con-

densate water and boiler feedwater system, replacement of feedwater heater, improvement/rehabilitation of feedwater heater drain control system, retubing of boiler and having another set of spare tubes, repairing of boiler casing, replacement of air preheater element and obtaining another set of spare element. Improvement/rehabilitation of building ventilation etc., should be performed first in preference to change of M-BFP capacity.

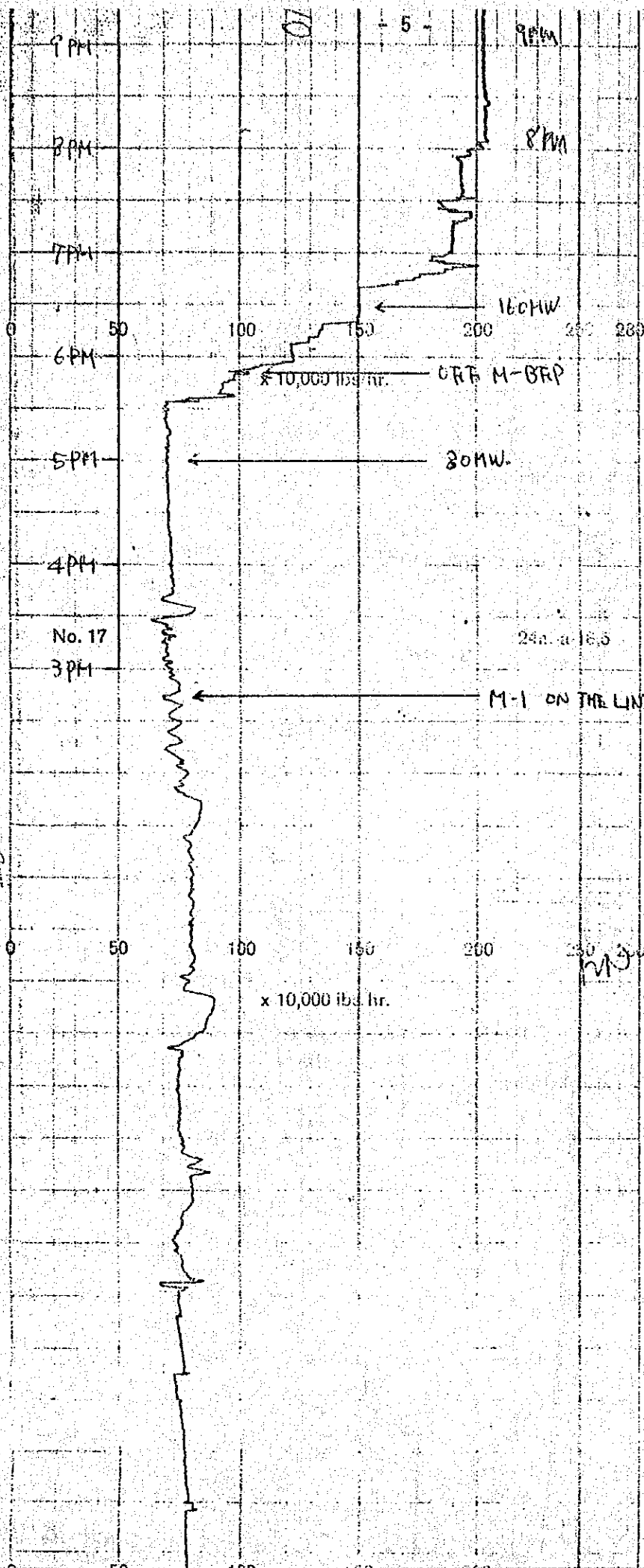
Ranking of preference should be determined to include the improvement/rehabilitation of M-2

e. Operating conditions were analyzed in accordance with the data gathered on feedwater flow, since Jan. 1982 until now, as follows:

- ° T-BFP is started at 80 MW - 100 MW
- ° Generator output is increased with the service of T-BFP
- ° M-BFP is stopped at around 120 MW
- ° Target output for stable operation is set at 160 MW
- ° Time for load up from 80 MW to 160 MW, including changeover of BFP, is one hour earlier, two hour average.

According to the above study, there is no problem on changeover of existing M-BFP. (Refer to attached sheets)



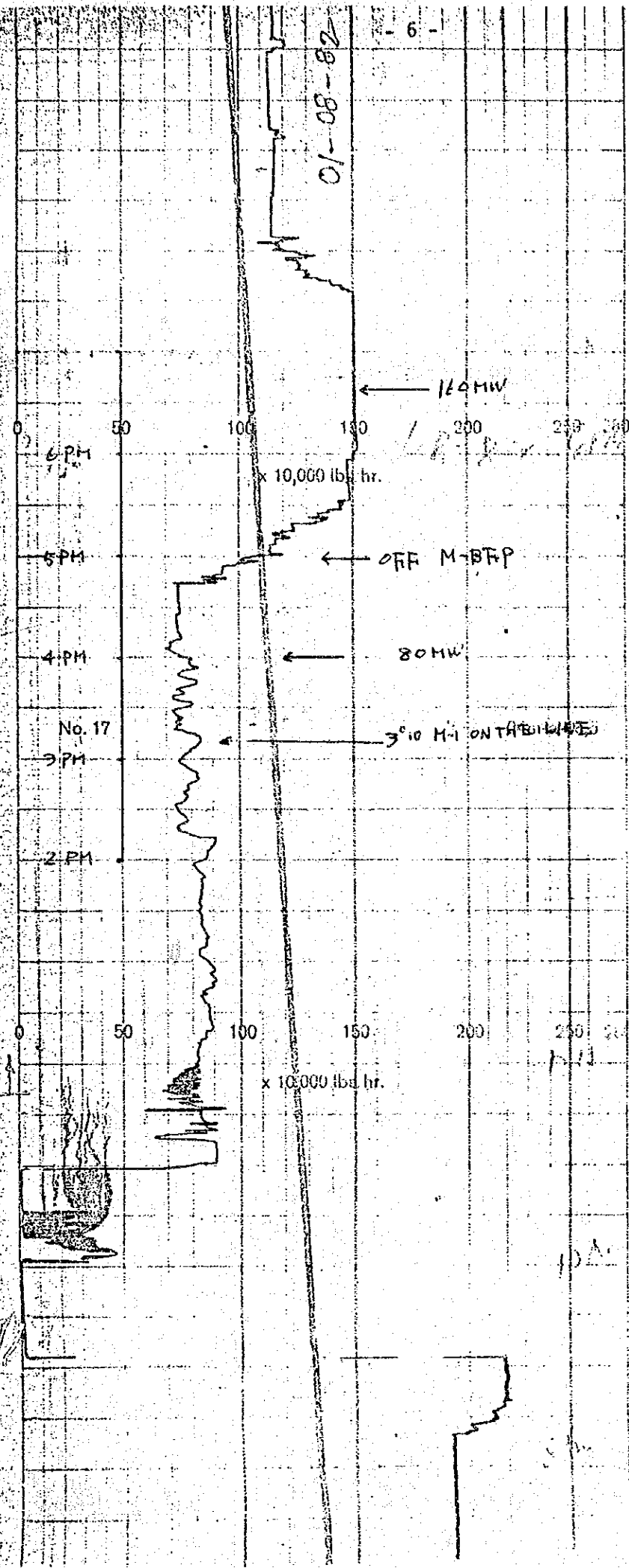


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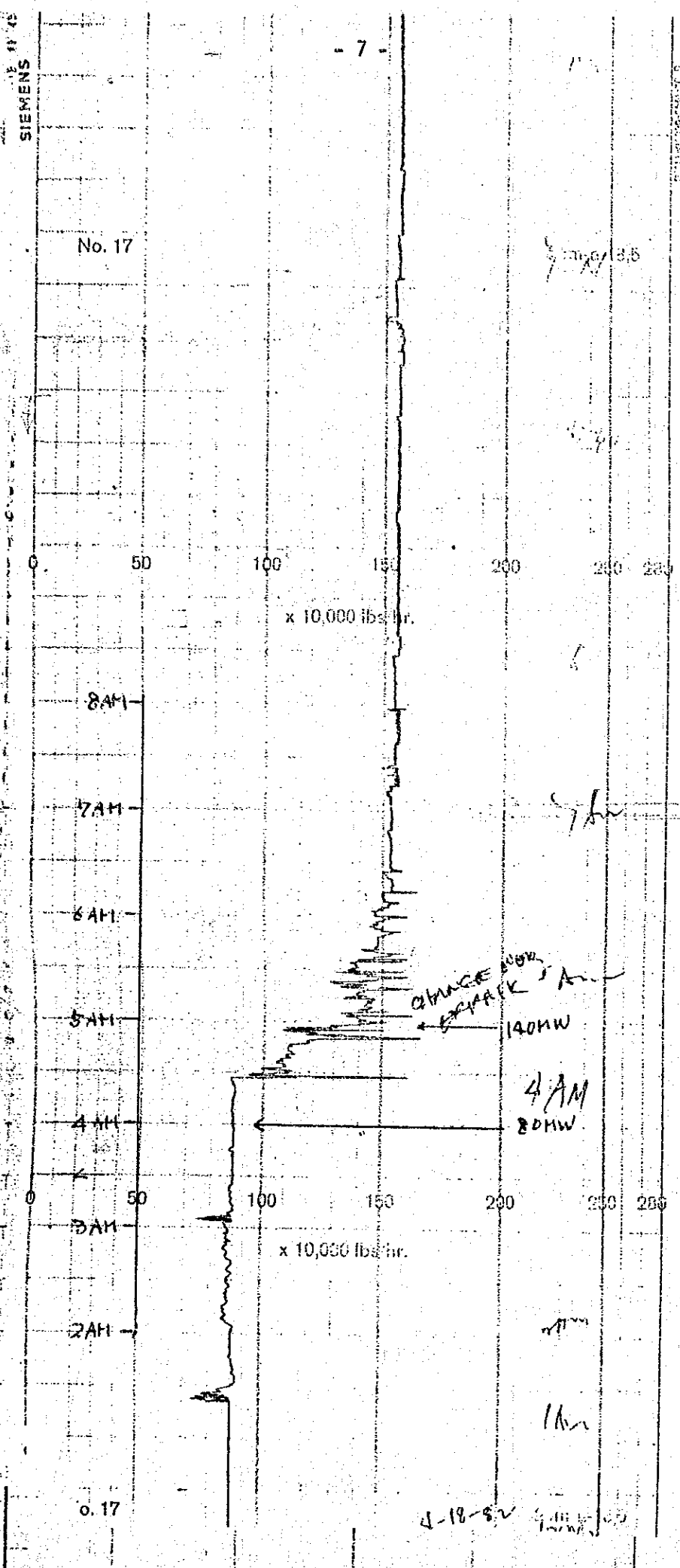
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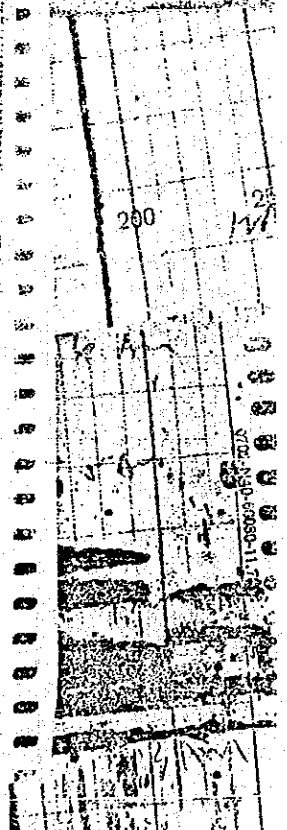


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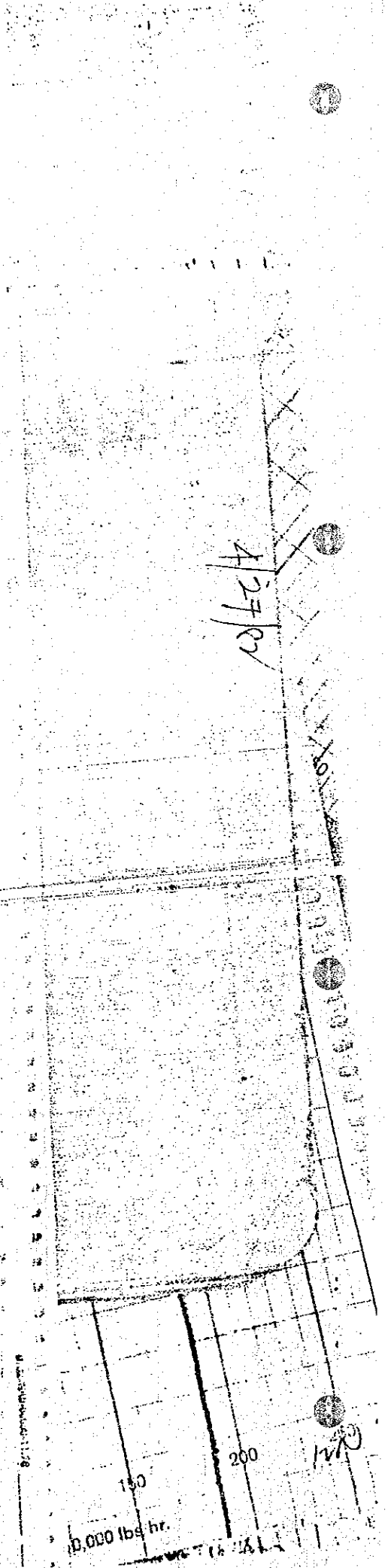
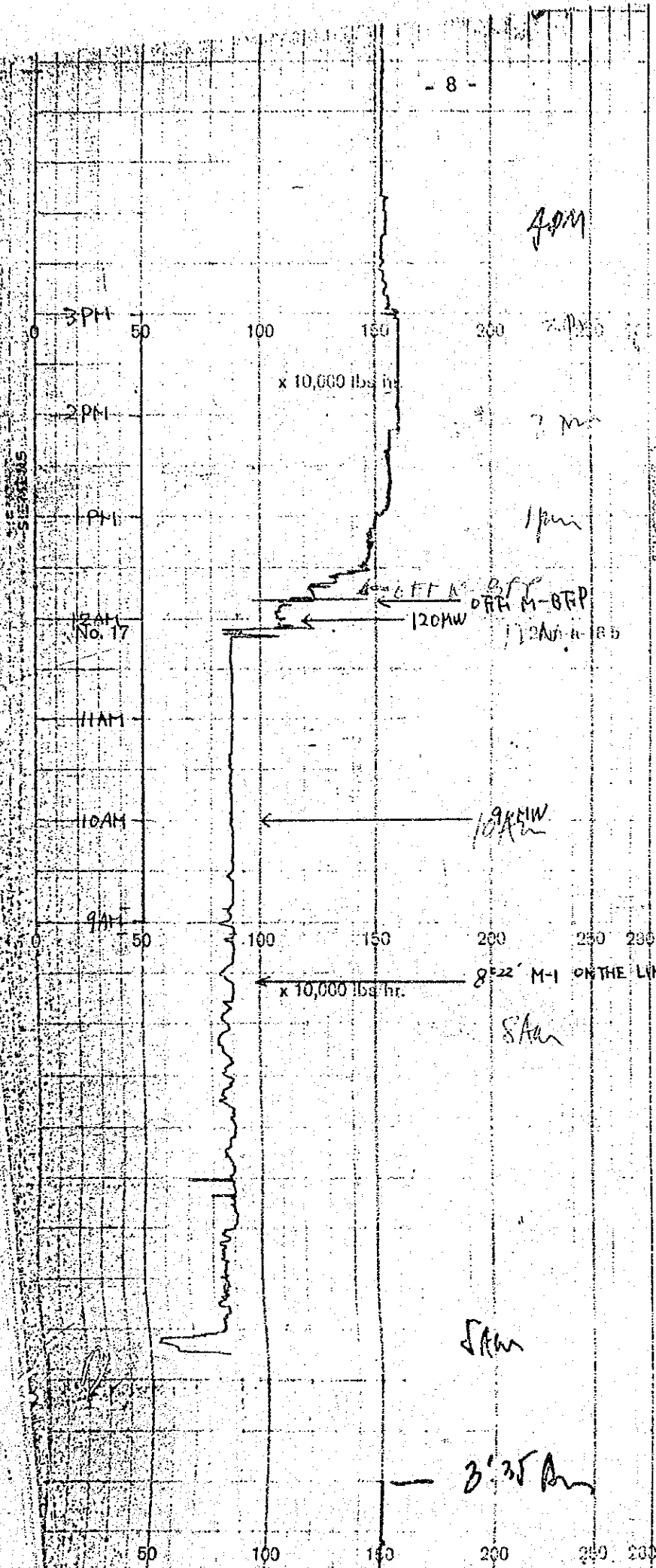


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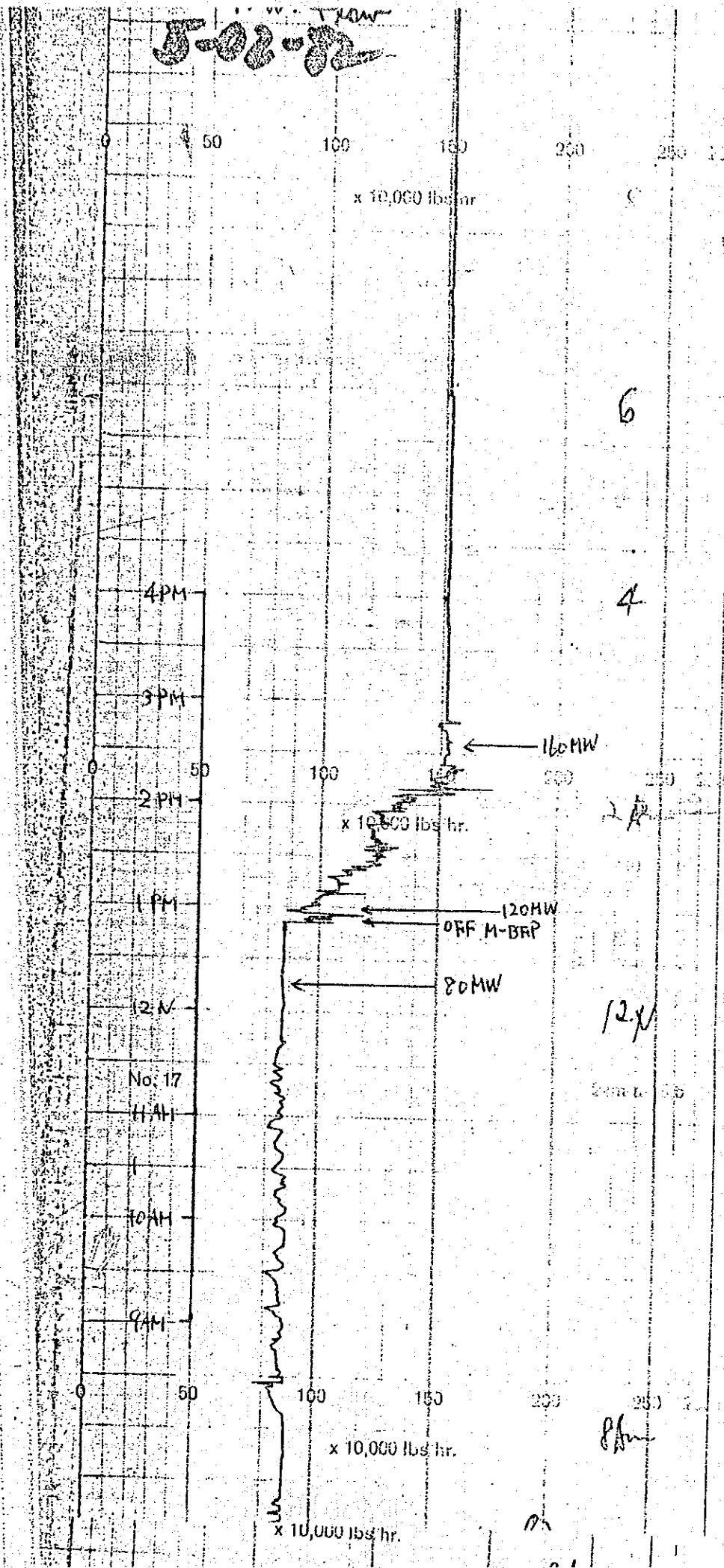


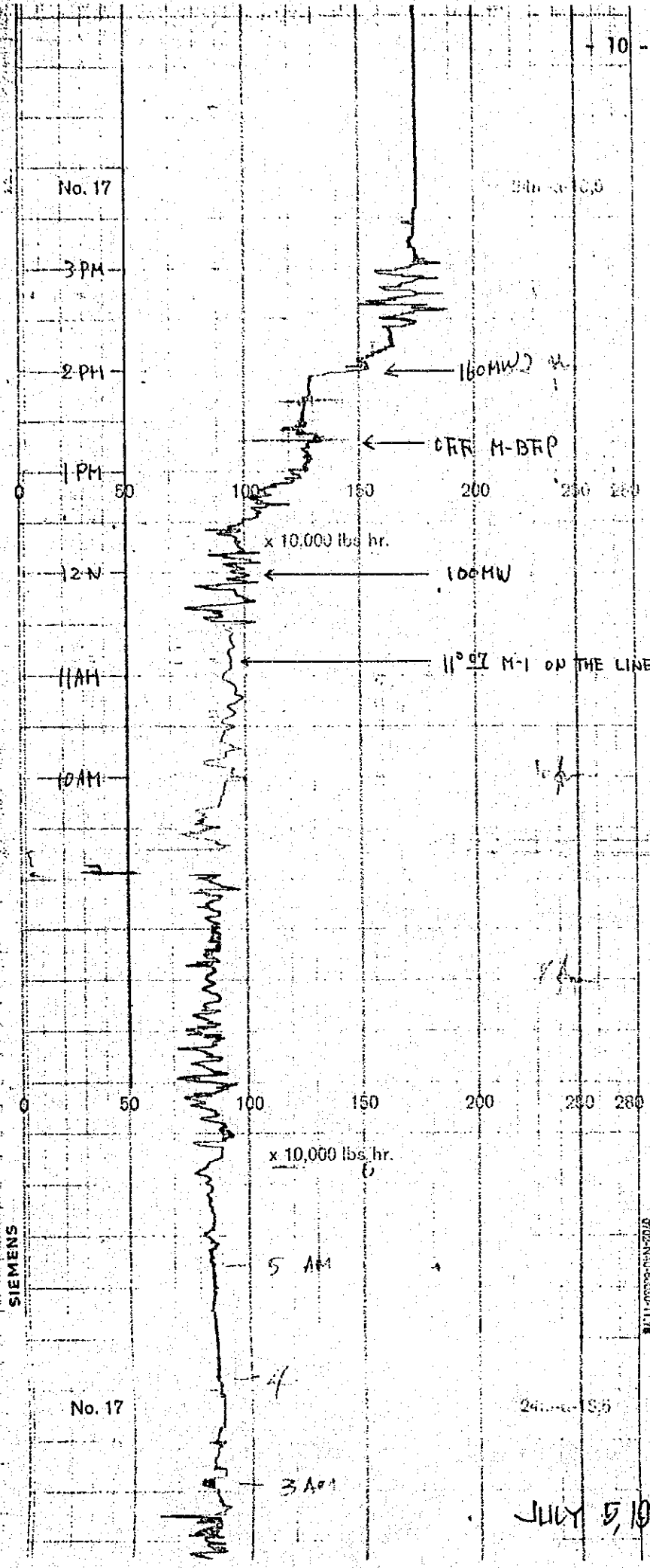
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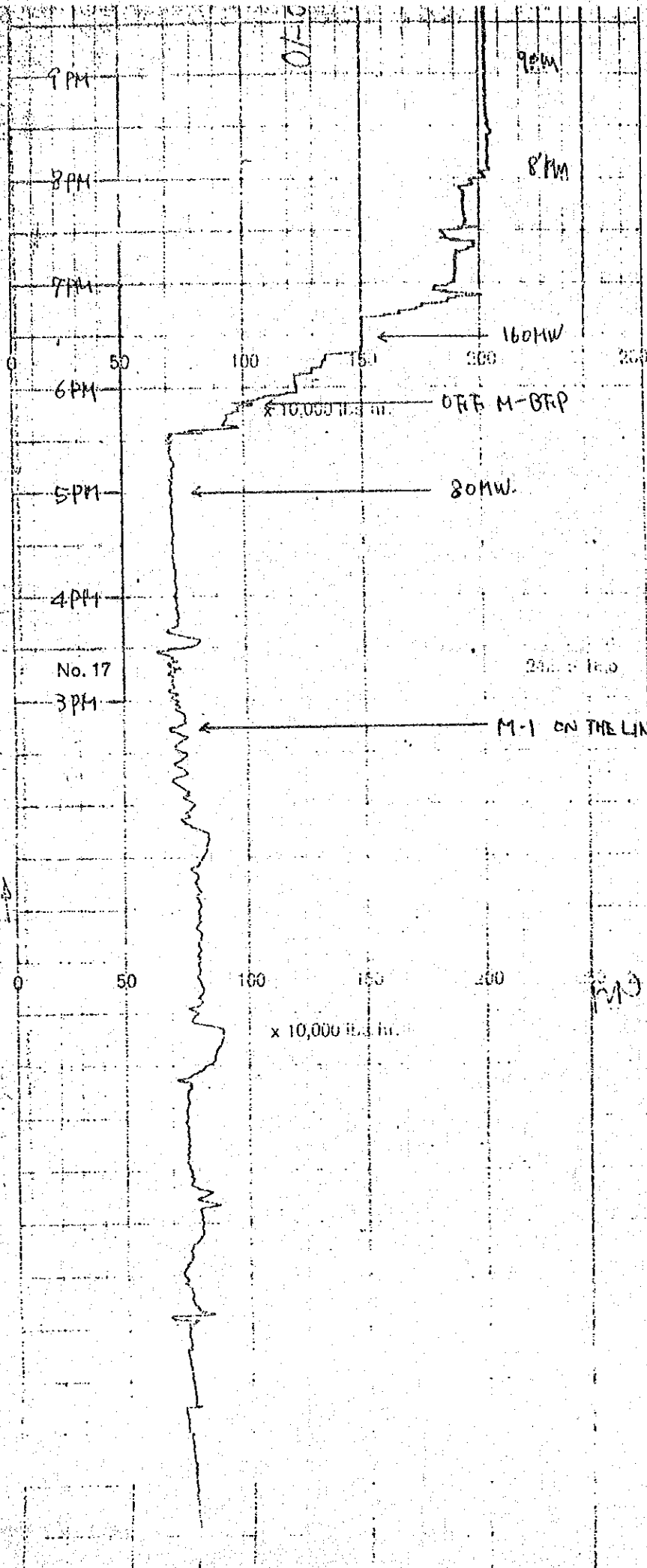
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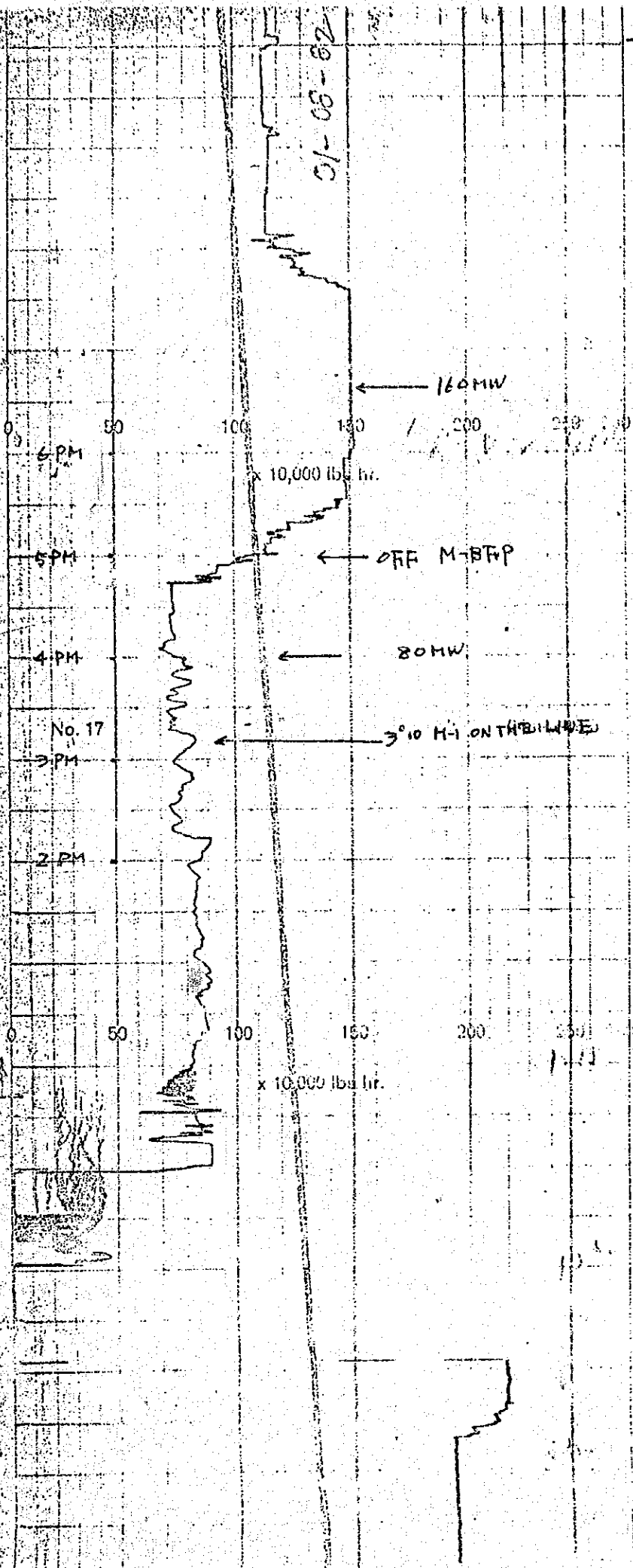
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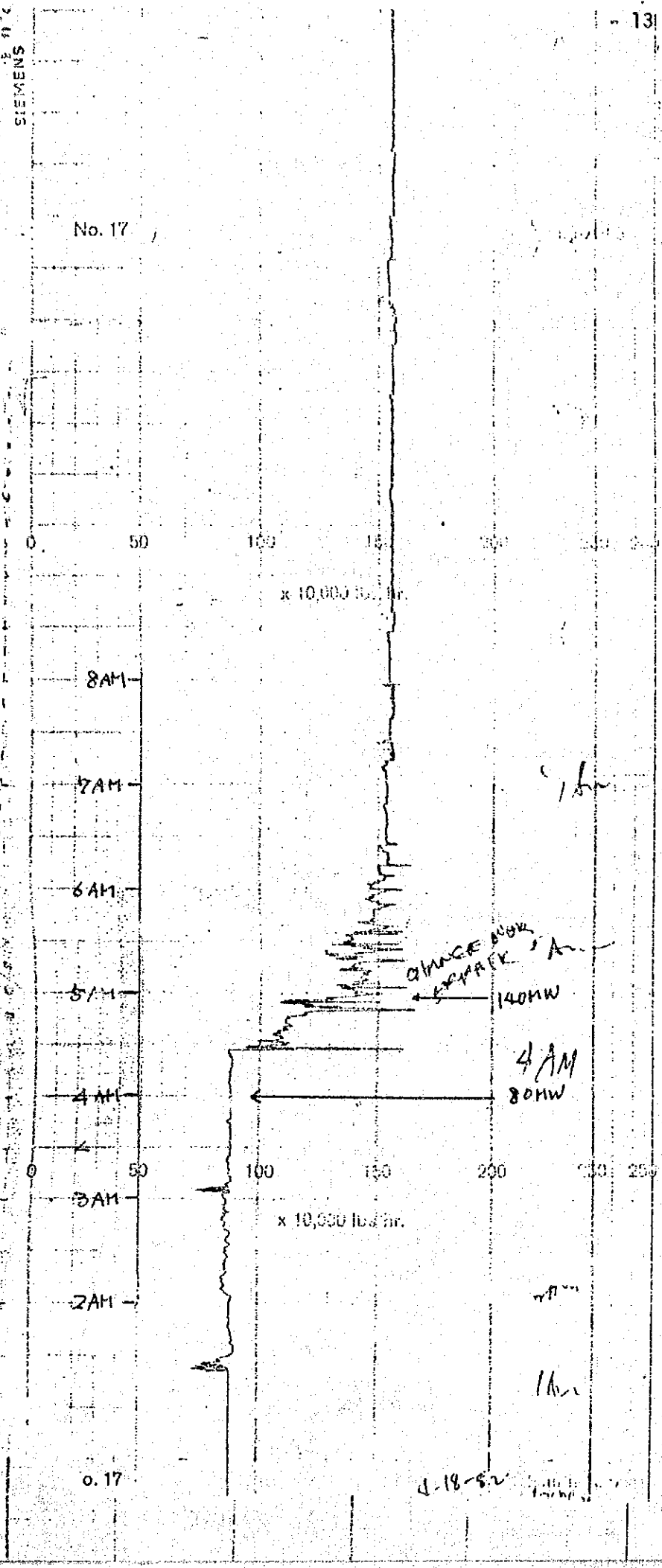
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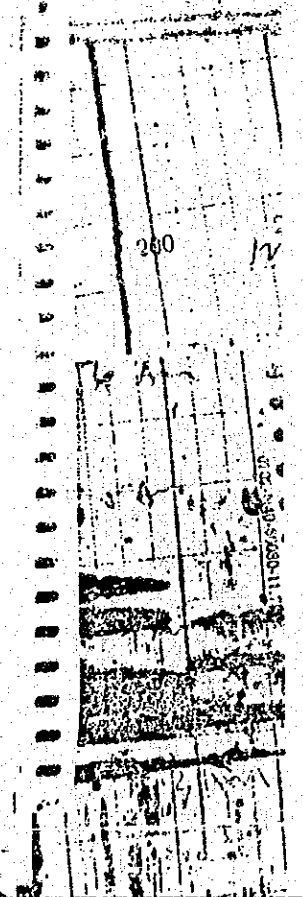
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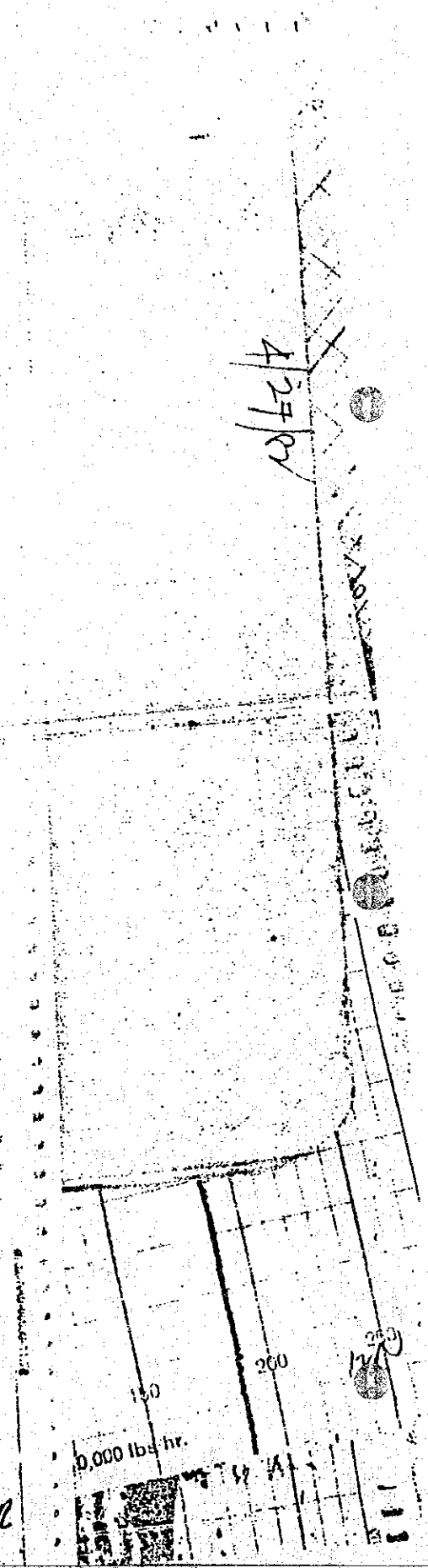
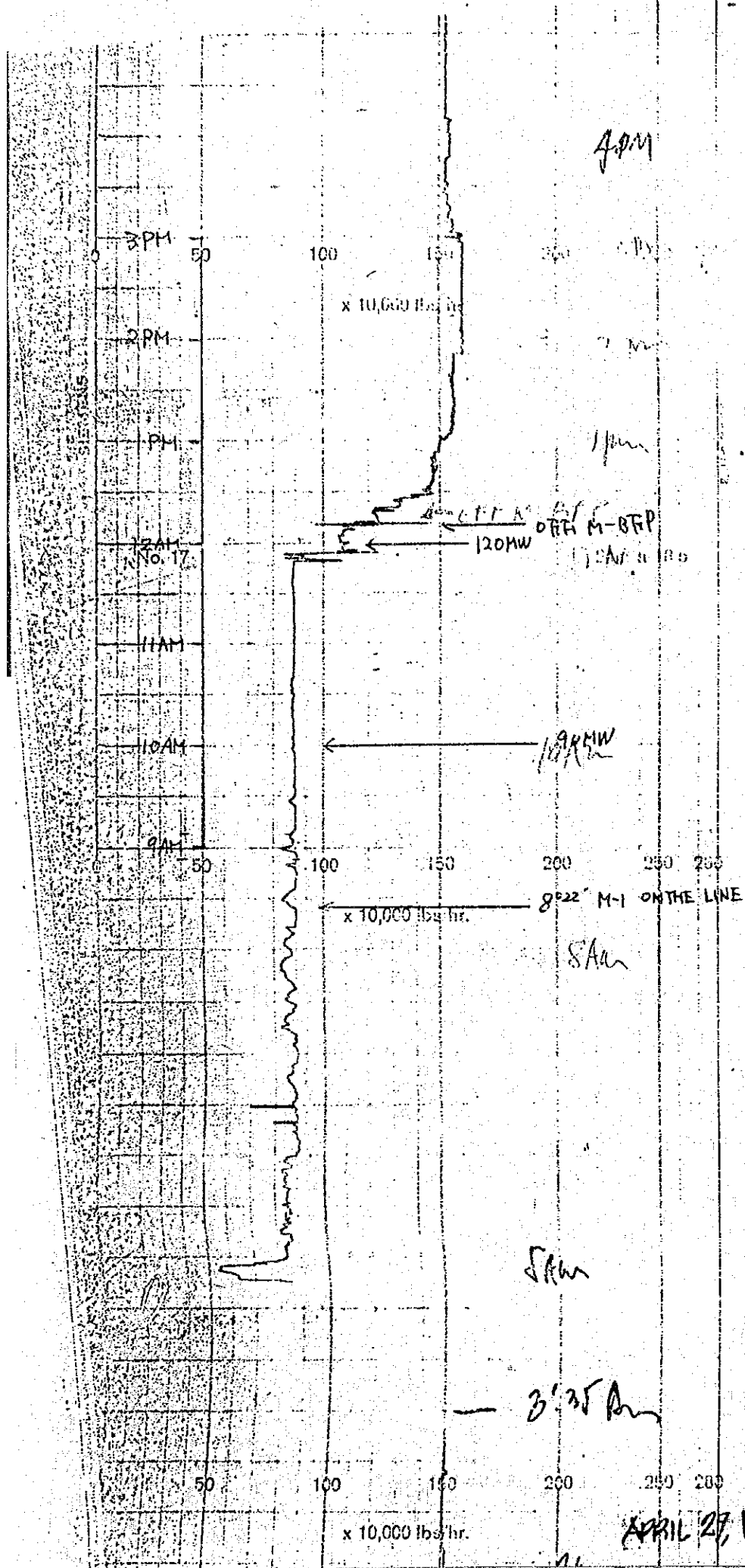
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