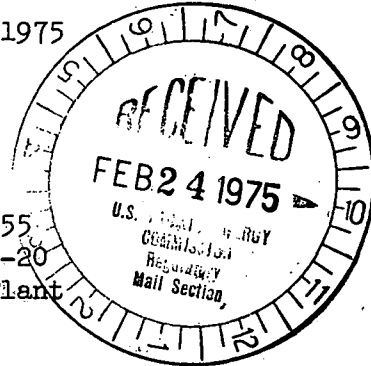




**Consumers
Power
Company**

General Offices: 212 West Michigan Avenue, Jackson, Michigan 49201 • Area Code 517 788-0550

February 20, 1975



Mr. Robert A. Purple
Division of Reactor Licensing
US Nuclear Regulatory Commission
Washington, DC 20555

Re: Docket 50-255
License DPR-20
Palisades Plant

Dear Mr. Purple:

By letter dated February 4, 1975 you requested additional information concerning our proposed technical specification changes for the Palisades Plant dated December 13, 1974 and January 23, 1975. Attached are the responses to items of additional information requested.

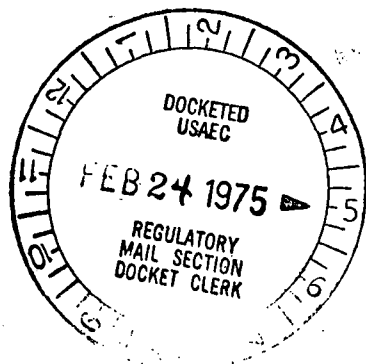
Responses to the first four items of additional information requested were provided by letters dated January 31, 1975 and February 6, 1975. The seventh and only remaining item of your request for additional information is not provided at this time. As discussed in our meeting of January 21, 1975, the development of a new tube plugging criteria will require a significant amount of engineering effort. This effort has been initiated; however, at the present time a projection of a firm schedule for completion of the effort and submittal to the NRC is not possible. We will provide an estimated date for submittal of this information to the NRC when a reasonable schedule is developed.

Yours very truly,

Ralph B. Sewell
Nuclear Licensing Administrator

RBS/smm

CC: JGKeppler, USNRC



2093

Regulatory Docket File

RESPONSES TO USNRC
Request of February 4, 1975
for Additional Information

Question 5

"Compare the all-volatile treatment (AVT) chemistry specifications with the secondary coolant chemical condition established from the start of AVT treatment to the present."

Response

Initial objectives for steam generator chemistry during the steam generator flushing program were given in Attachment C to our August 20, 1974 submittal and are summarized as follows:

pH in Range 8.2 - 9.0
Suspended Solids \leq 20 ppm
Conductivity \leq 100 μ mhos/cm
PO₄ as Low as Possible. (Target of \leq 5 ppm)

Further acceptable chemistry (with respect to power level increases during the flushing program) would be considered to have been achieved when further actions did not result in moving chemistry toward normal operation.

Further, an ultimate objective was conformance with more stringent specifications to achieve typical industry practices regarding all volatile treatments of "fresh" steam generators. Prior to the start of the flush program, it was felt that these specifications could not be achieved until long periods of prolonged operation following completion of the flushing program. These specifications are as follows:

	<u>Normal Specifications(1)</u>	<u>Abnormal Limits(2)</u>
pH	8.2 - 9.0	7.5 - 9.5
Conductivity (Specific)	7 μ mhos/cm	15 μ mhos/cm
Suspended Solids	< 1.0 ppm	10 ppm
Silica	< 1.0 ppm	10 ppm

Notes

- (1) Normal specifications are those which should be maintained by continuous steam generator blowdown during proper operation of secondary systems.
- (2) Abnormal limits indicate a fault condition exists and plant shutdown should be commenced if abnormal limits are exceeded for 12 hours and it appears likely that these specifications cannot be achieved within the next 12 hours.

At the start of the flushing program, August 14, conductivity in the steam generator was about 700 to 800 μ mhos/cm. Phosphate concentration was 700-800 ppm, silica ranged from 0.1 to 2.8 ppm and suspended solids generally were below 1 ppm. Steam generator solution pH during the flush was typically in the 7.5 to 9.5 range.

On the first day of power operation, October 1, conductivity was about 30 μ mhos/cm. Suspended solids were 120 ppm and phosphate was 10-18 ppm. By October 3, phosphates had been reduced to less than 1 ppm. Conductivity had been reduced to less than 7 μ mhos/cm (the ultimate limit) by October 10. Silica had been consistently below 0.5 ppm during these first few days of operation. There had been no difficulties maintaining the operating pH. Suspended solids gradually decreased to normal operating level over a period of a week. From October 10 until October 17 the Palisades steam generator operated with all-volatile chemistry. The only chemicals added were hydrazine and morpholine. During this one-week operation, Palisades steam generator chemistry was well within the ultimate specification.

Condenser tube leaks as experienced on October 7, 17 and 30 have a devastating influence on steam generator chemistry (condenser has been retubed since October 30 shutdown). Conductivities increased to the 30 to 40 μ mhos/cm range and silica went as high as 30 ppm. It was not possible to maintain steam generator chemistry by blowdown. The pH was not affected to any extent since the alkalinity in the towers is fairly low. At no time since the start of the flush has there been measureable phenolphthalein alkalinity in the steam generators.

We believe, based on the foregoing summary of results, that we have achieved the ability to maintain an all-volatile secondary water chemistry treatment.

Question 6

"Provide a graph or plot showing the following as a function of time for both steam generators from the onset of isothermal flushing operations to the present:

- a. Phosphate and sulfate concentration,
- b. pH and,
- c. pounds of phosphate and sulfate removed.

Response

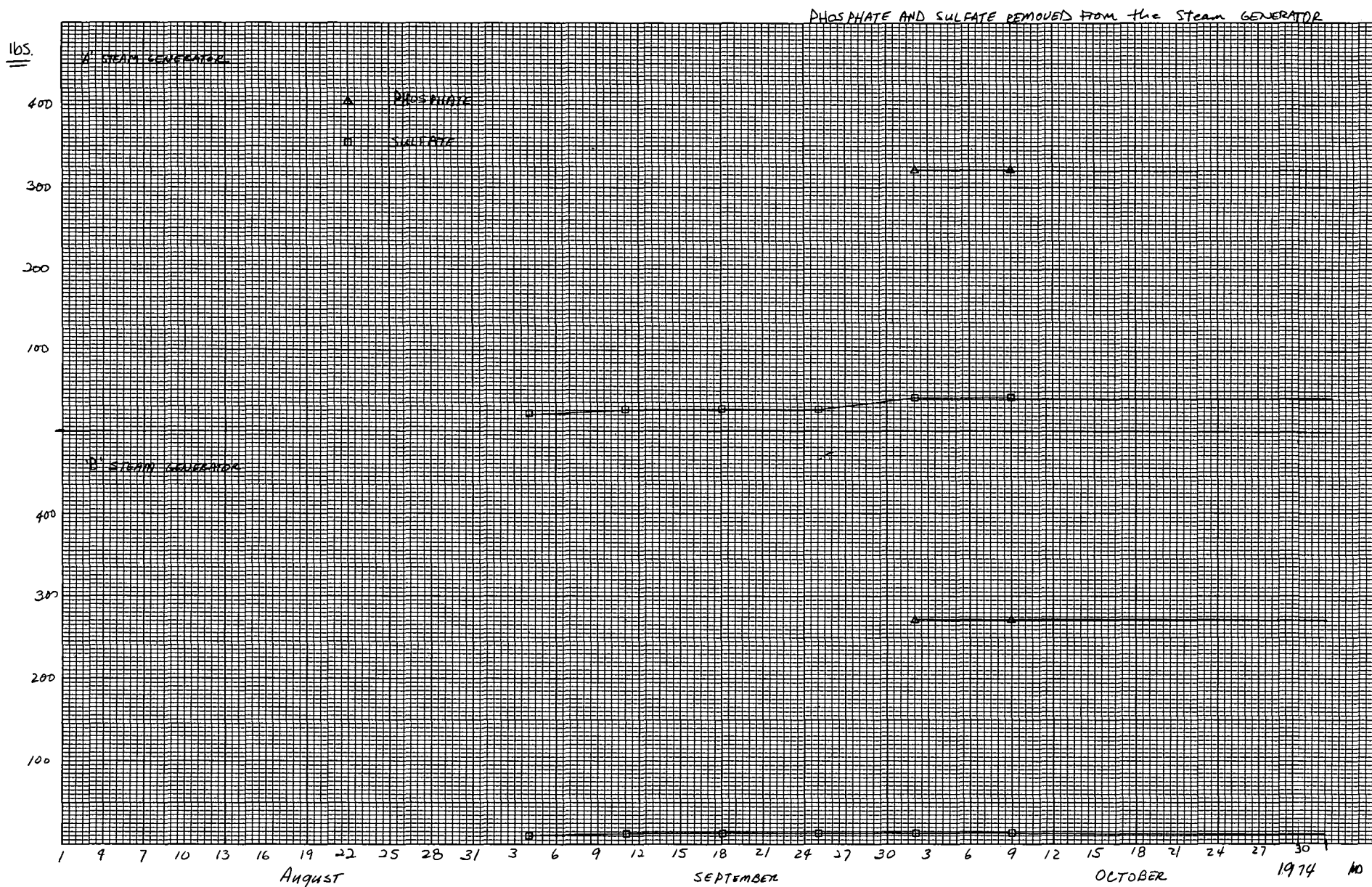
The attached graphs, supplemented by the notes listed below, are provided in response to this request.

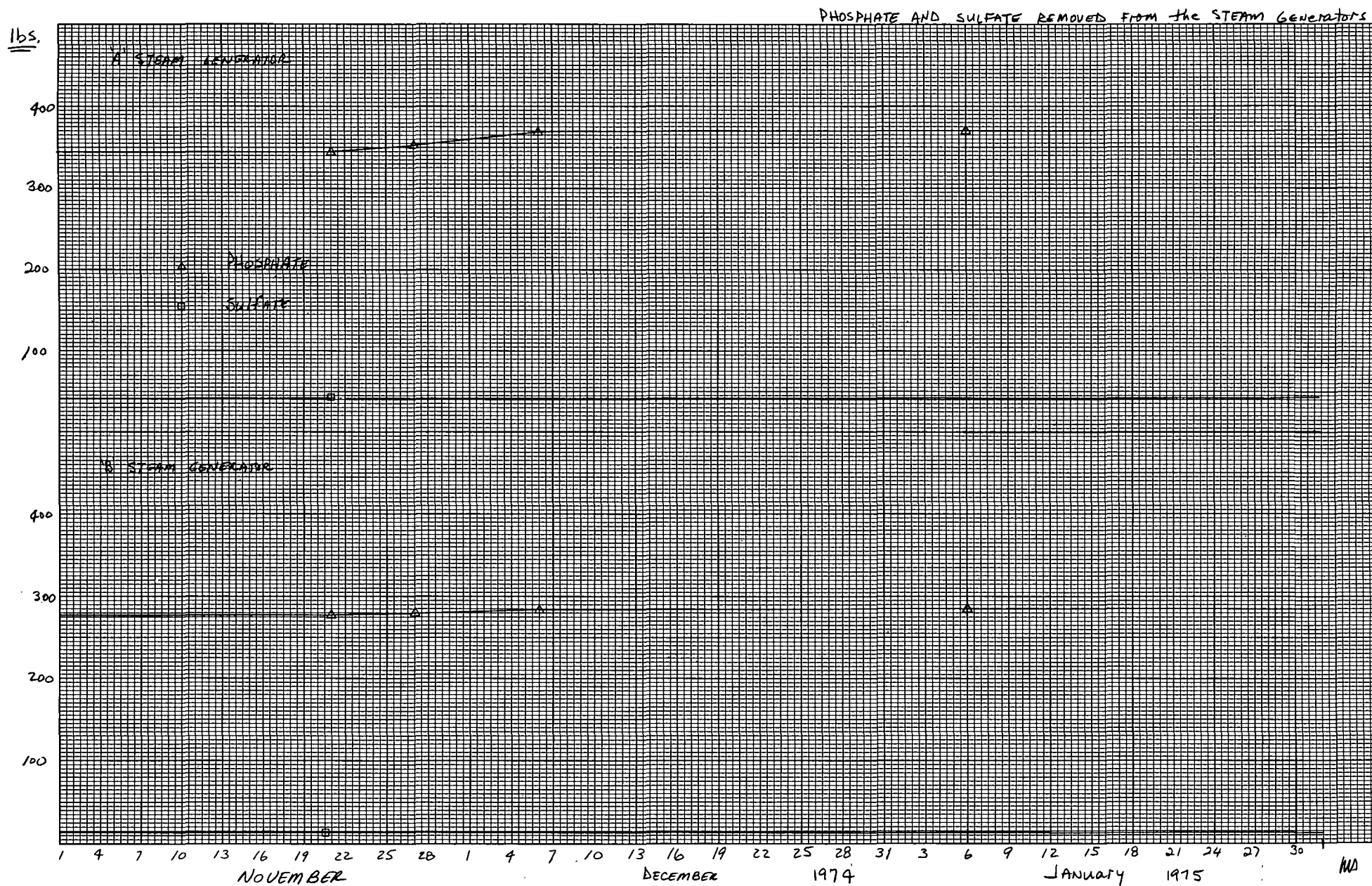
Notes

1. The letter "D" on several of the graphs indicates a sample (generally a composite) taken during a generator drain.

2. The first accounting of total PO_4 and SO_4 removed from the generators took place in early September; however, due to the error noted late in September with the PO_4 analysis, the total PO_4 removed starts in October. Quite a lot of work would be required to go back and add up the results for the missing four data points (September) and, therefore, it was not done.

3. Due to circulating water leakage (high in SO_4) after October 1, 1974, the pounds of sulfate removed from the generators were no longer calculated. It would be impossible to determine whether we are removing sulfate from the "old sludge" or from the "new sludge" caused by condenser leakage.





1 4 7 10 13 16 19 22 25 28 3 6 9 12 15 18 21 24 27 30 3 6 9 12 15 18 21 24 27 30
February MARCH April 1975



STORM GENERATOR

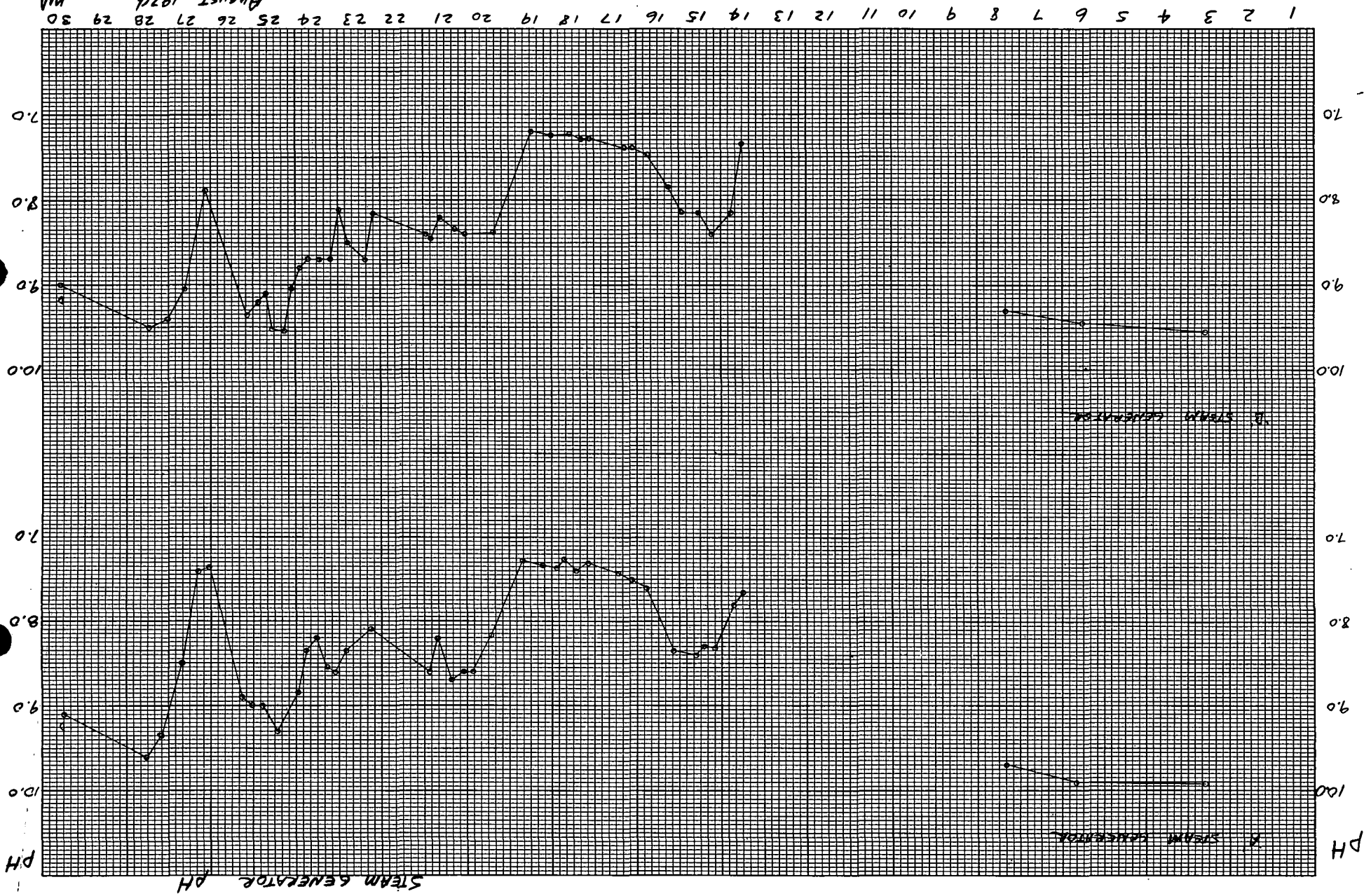
W SULFATE

A PHOSPHATE

STORM GENERATOR

PHOSPHATES AND SULFATES REMOVED FROM THE STORM GEN.

August 1974
MM



SEPTEMBER 1974

30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

7.0

8.0

9.0

10.0

7.0

8.0

9.0

10.0

pH

STEAM GENERATOR pH

7.0

8.0

9.0

10.0

7.0

8.0

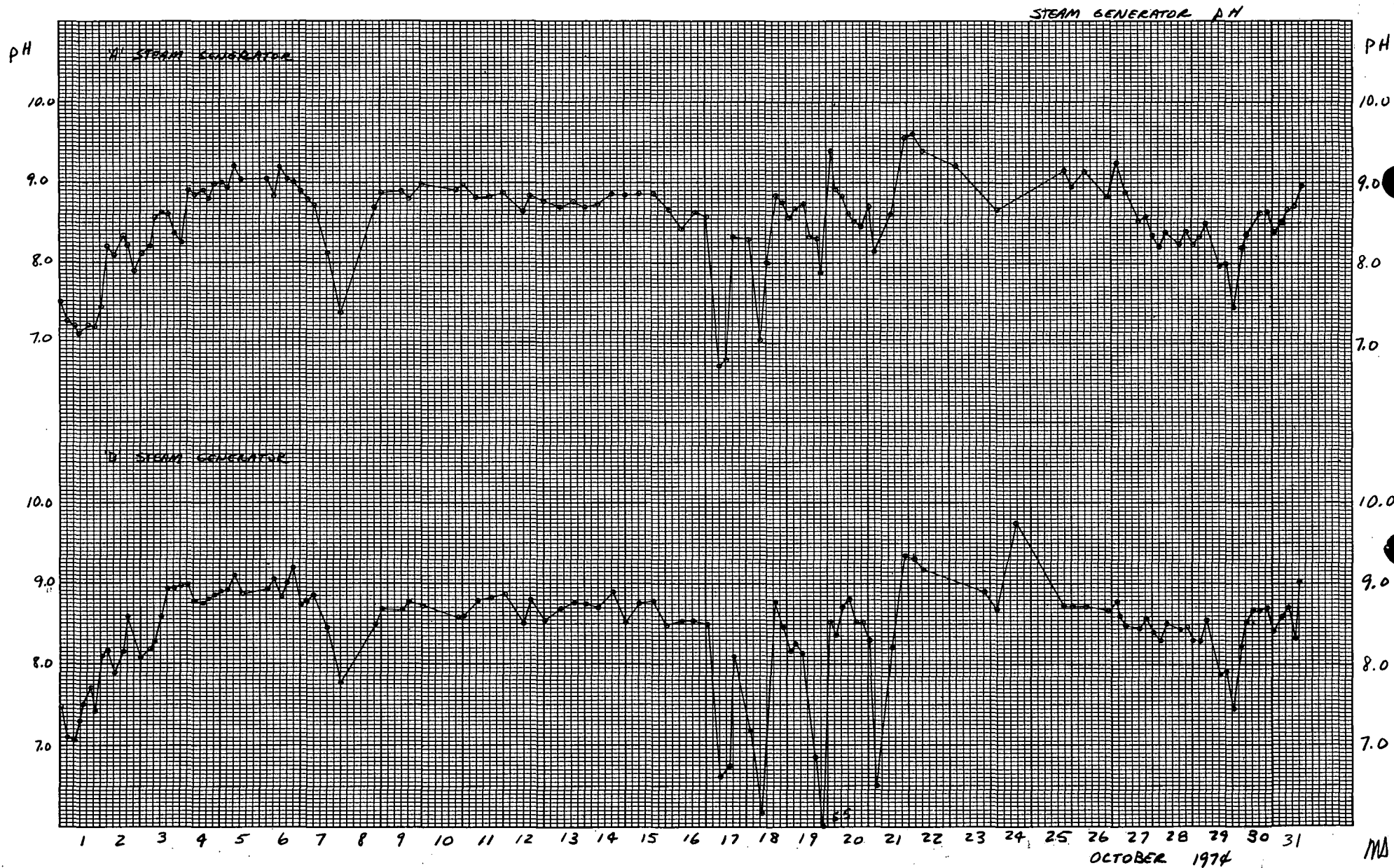
9.0

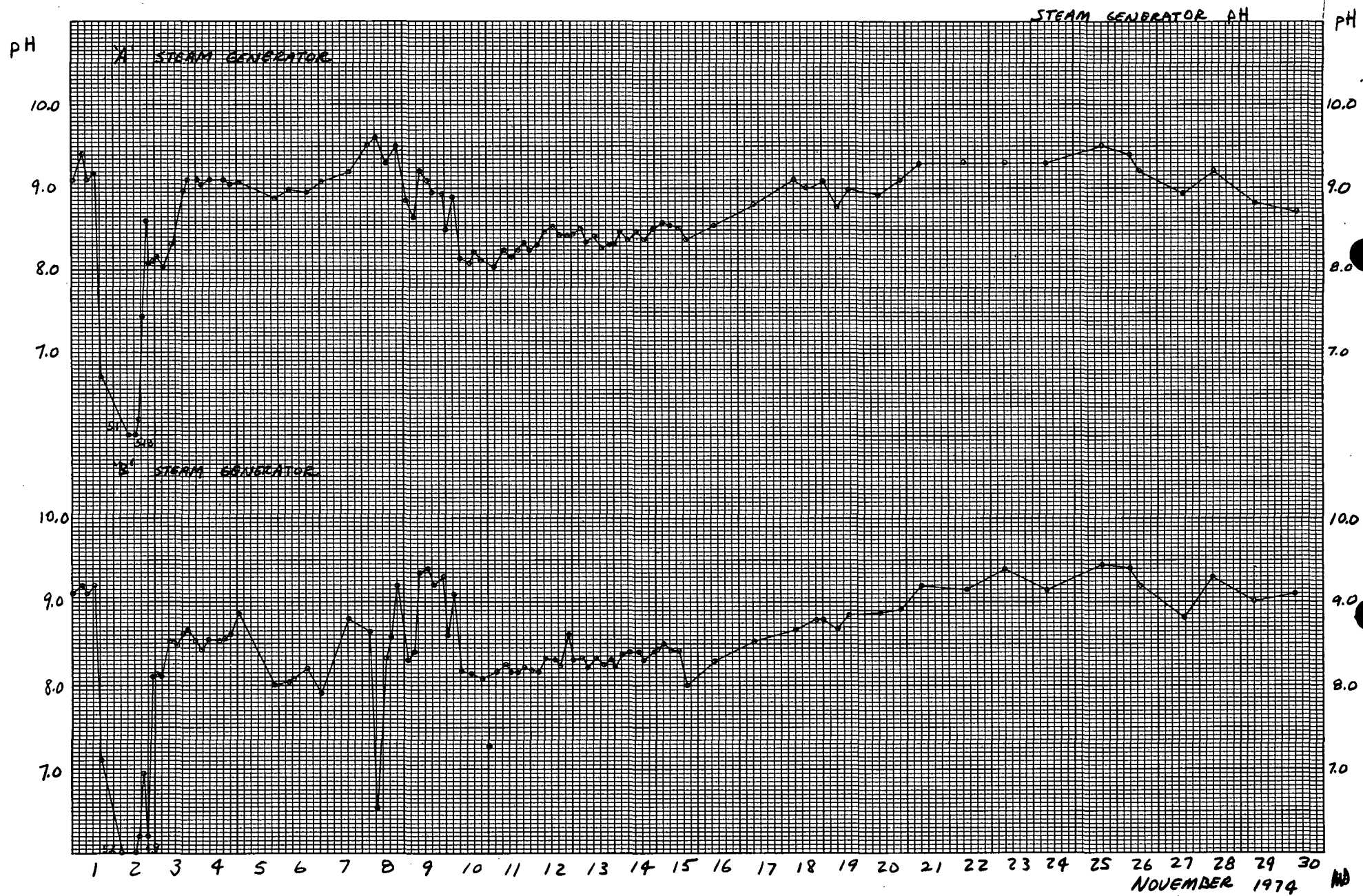
10.0

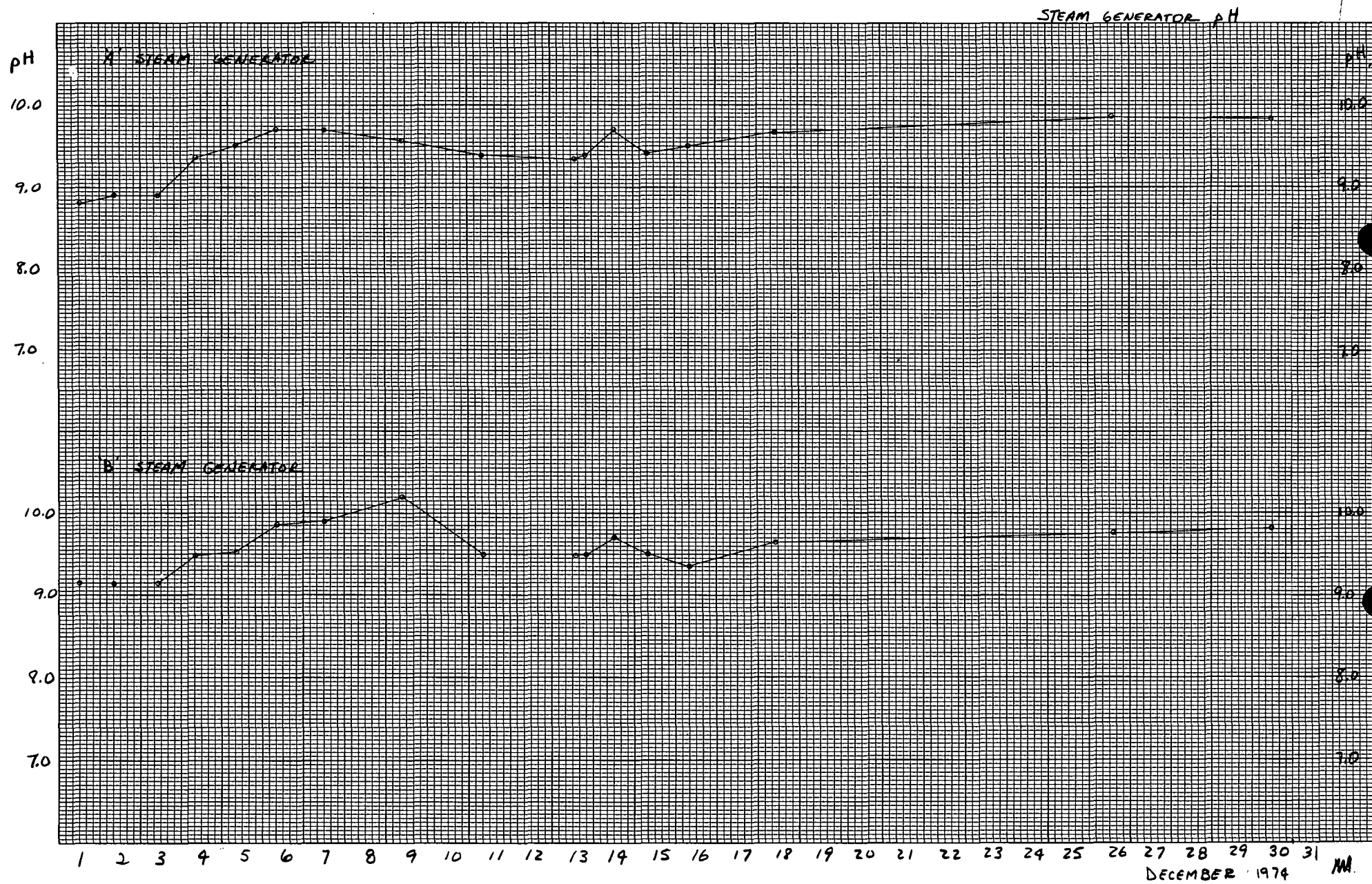
pH

STEAM GENERATOR

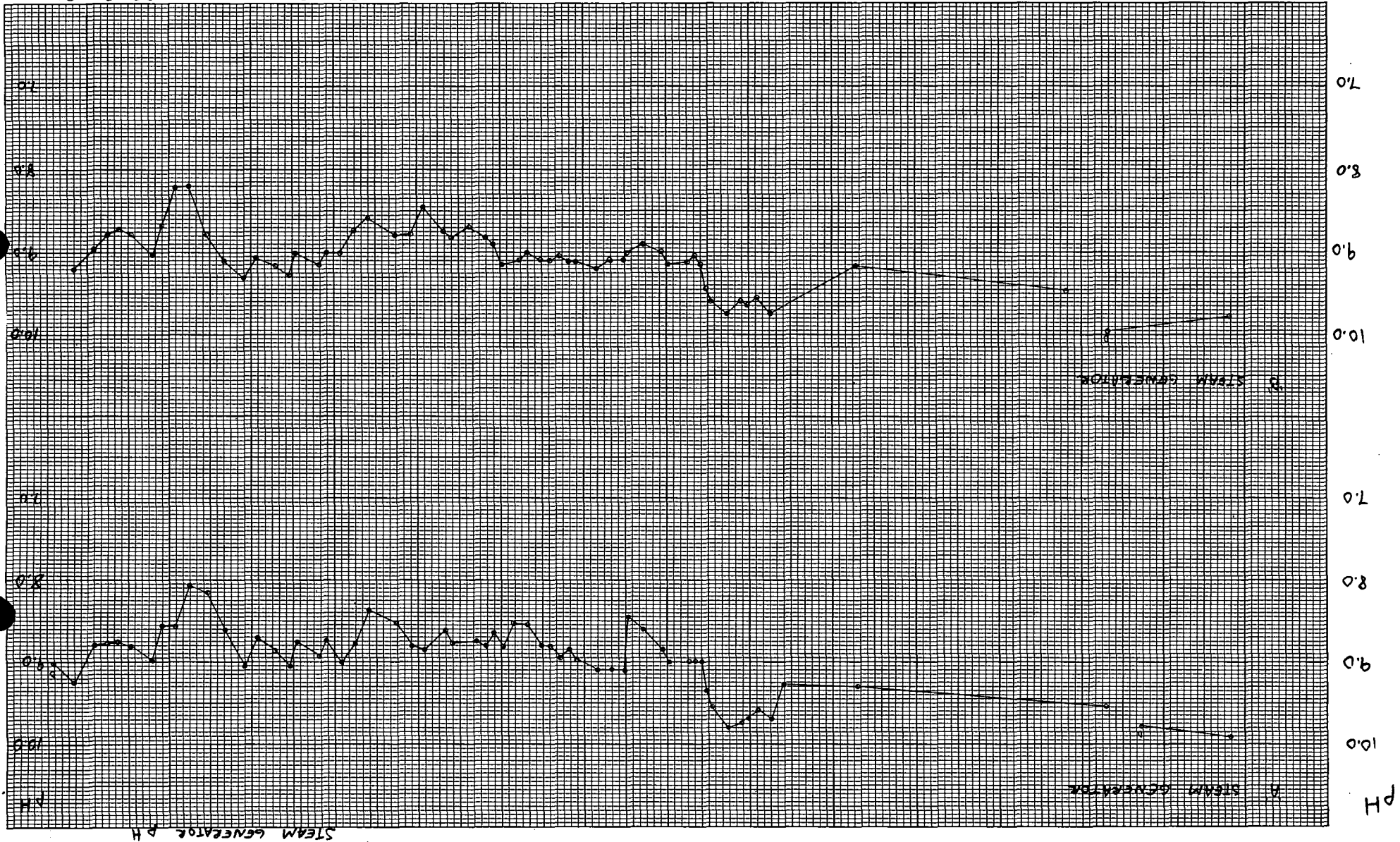
STEAM GENERATOR





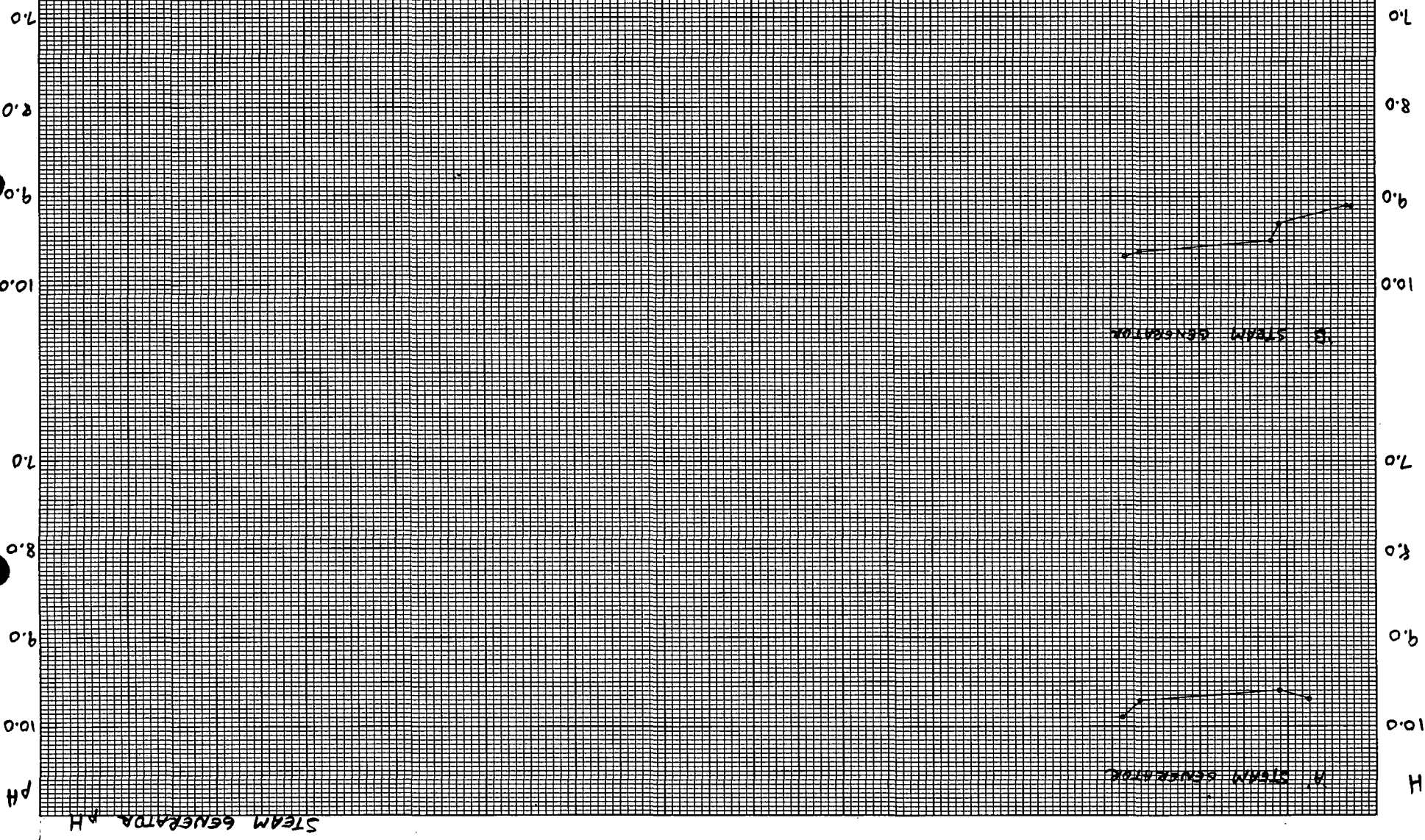


DM 31 JANUARY 1975



February 1975

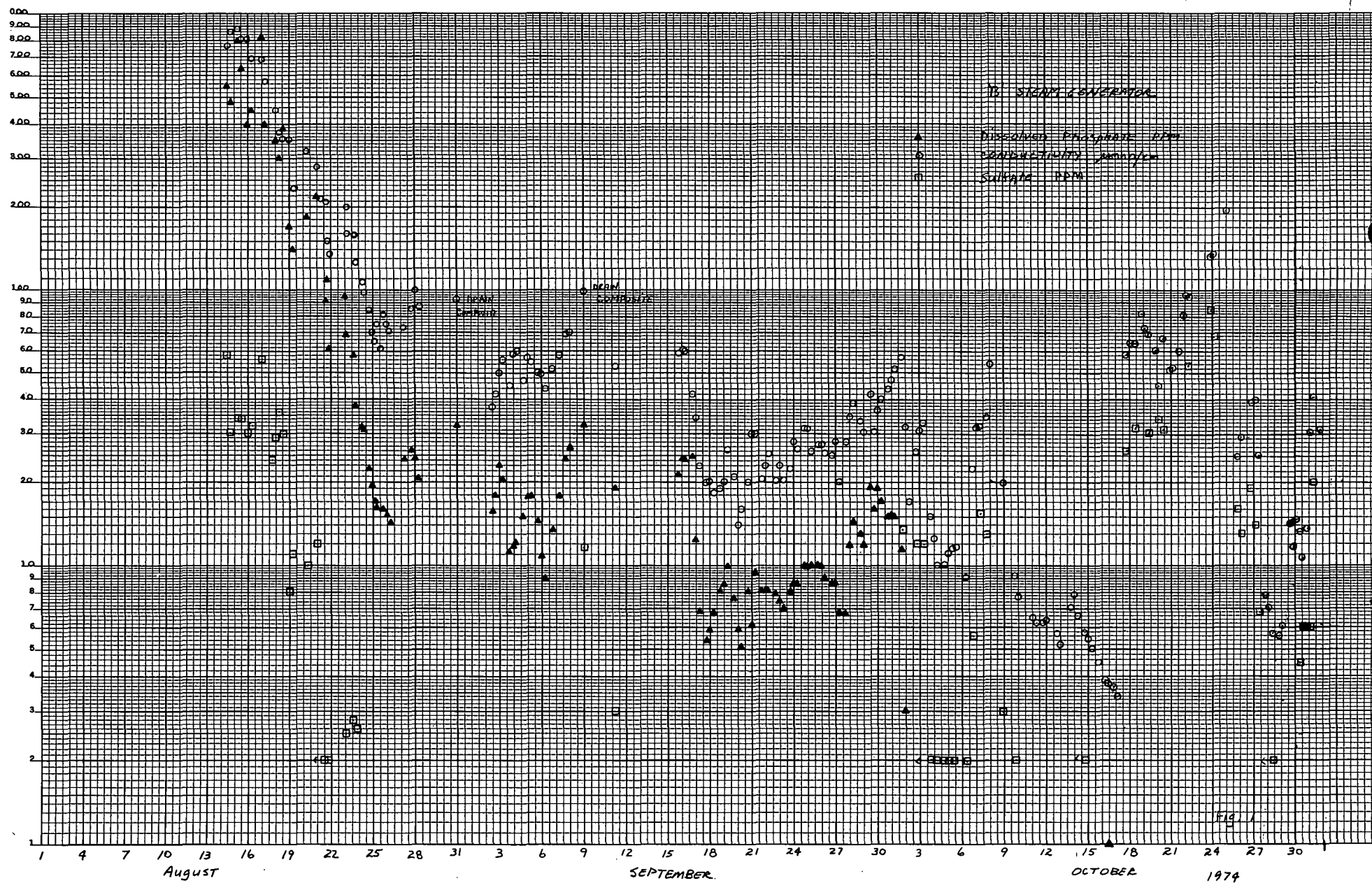
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28

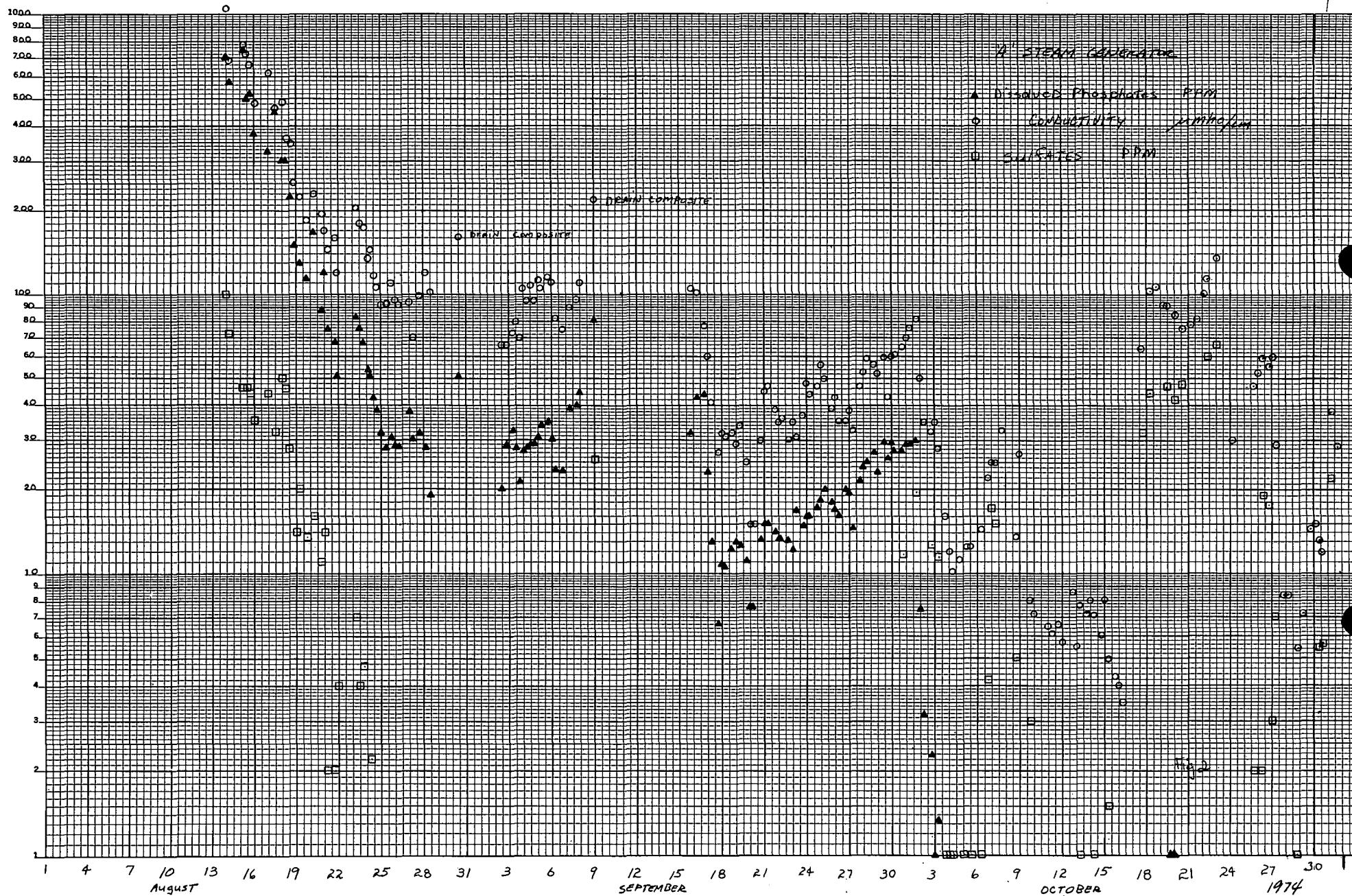


STEAM GENERATOR A pH

A STEAM GENERATOR

B STEAM GENERATOR

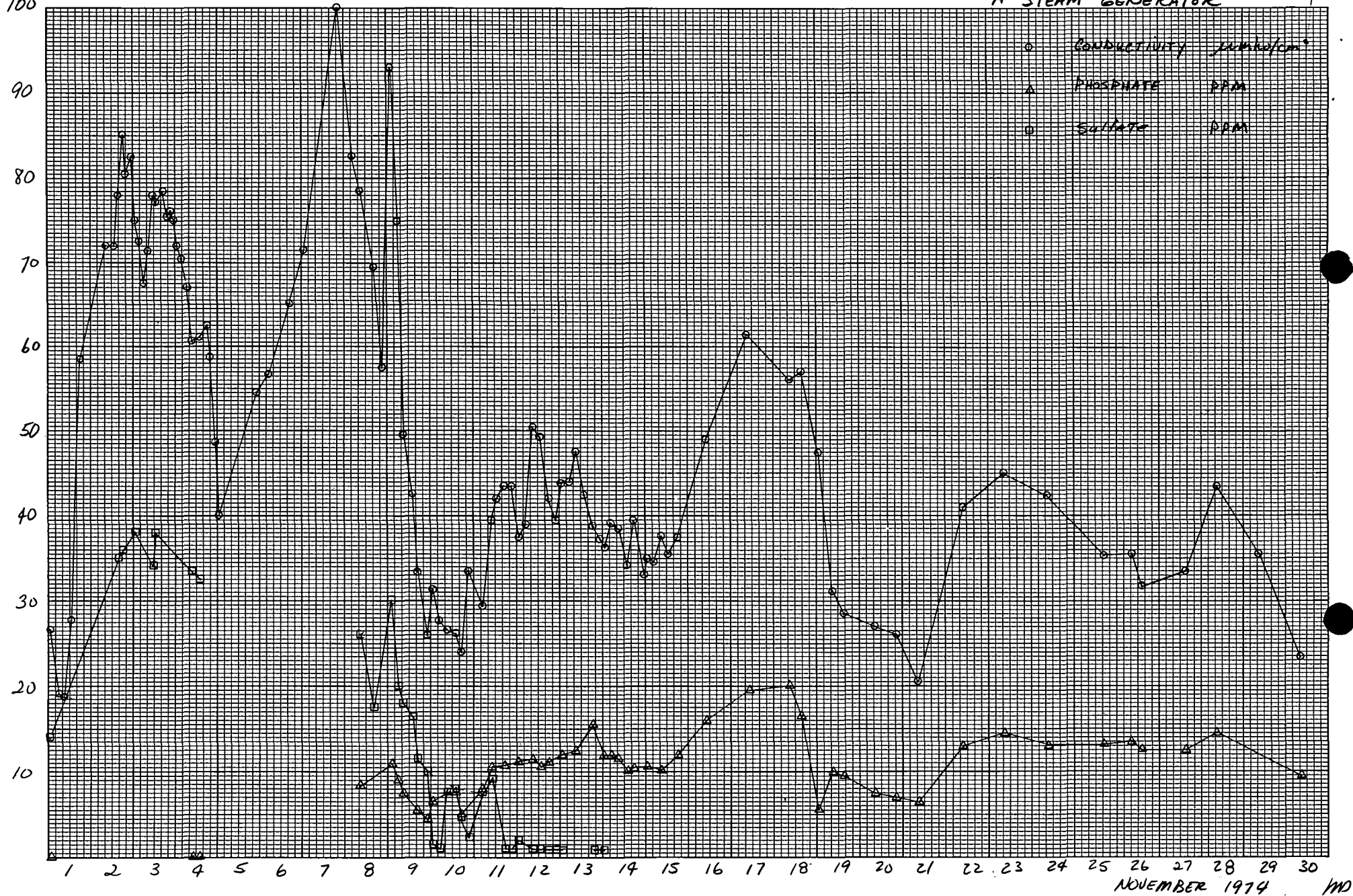




100

103.5

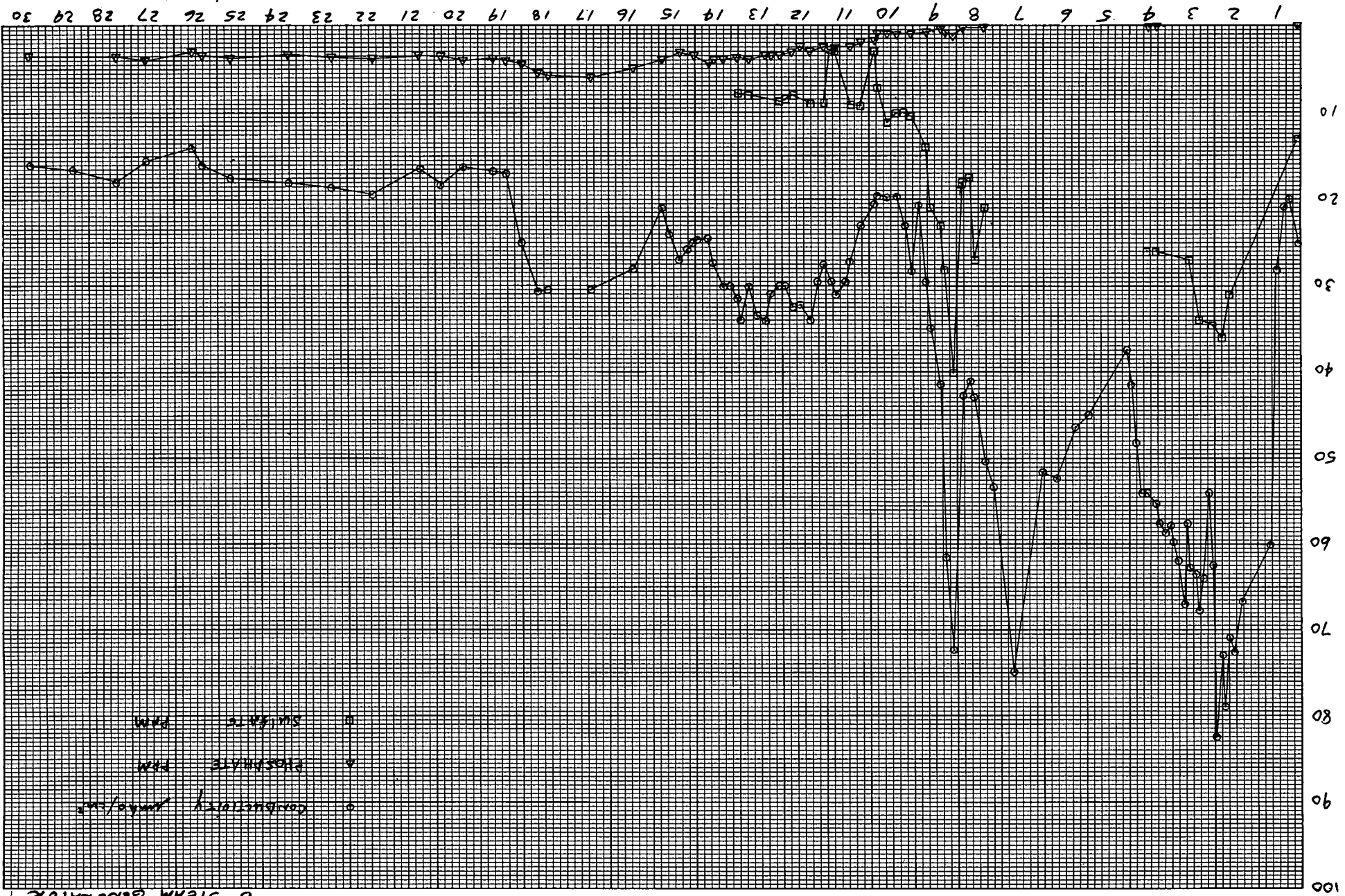
'A' STEAM GENERATOR



NOVEMBER 1974 MD

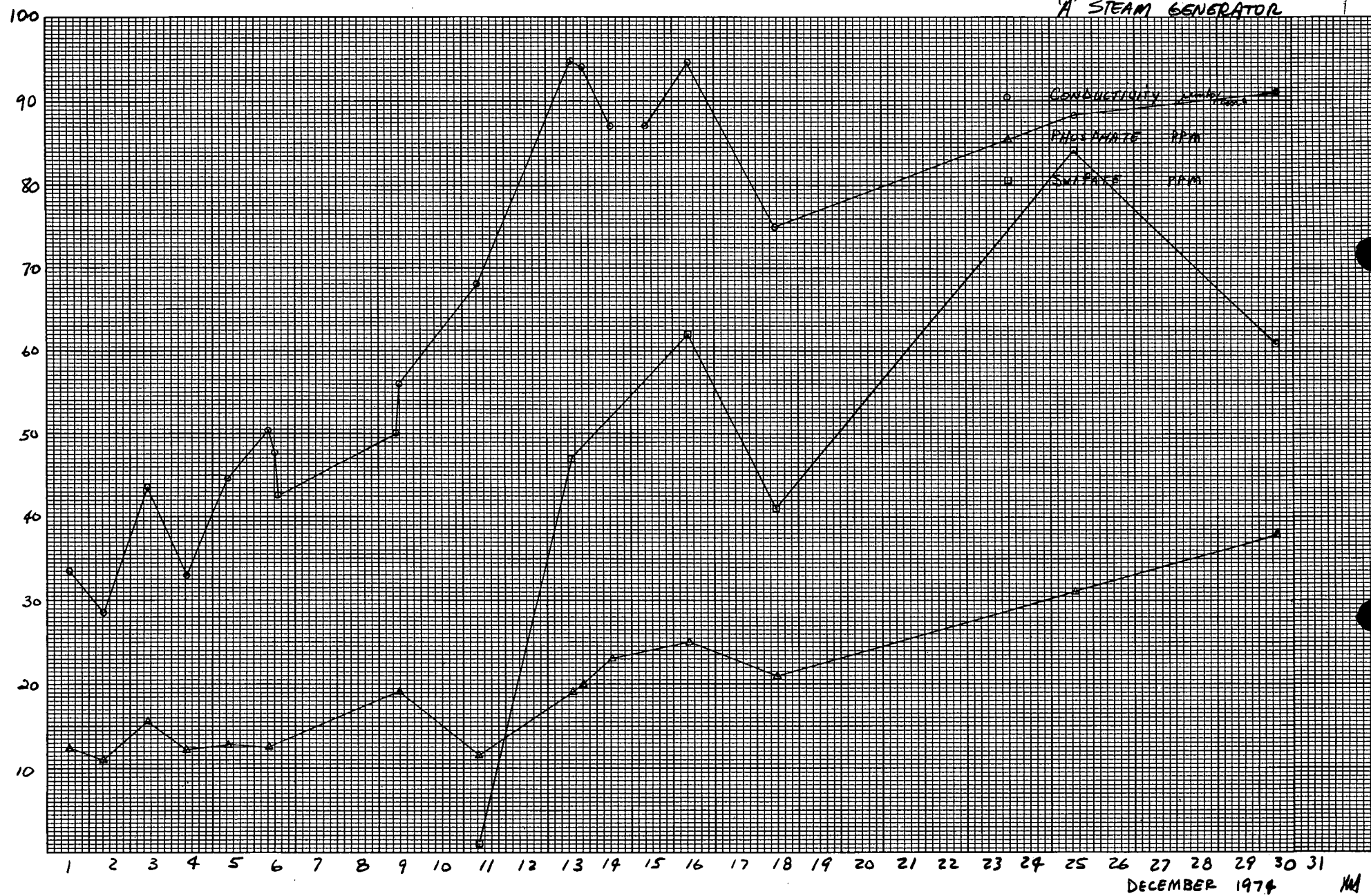
NOVEMBER 1974

WJ



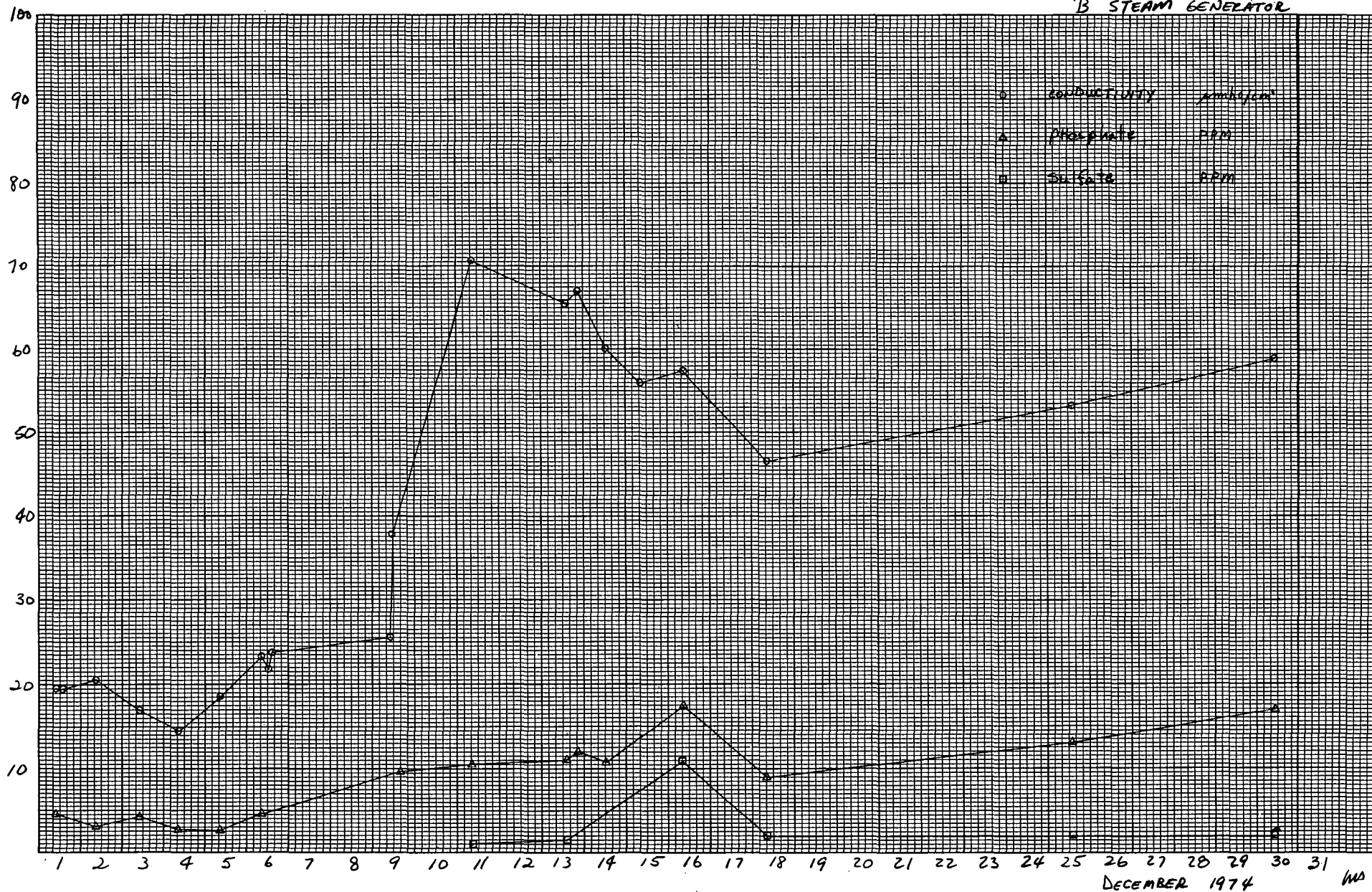
'B' STEAM GENERATOR

'A' STEAM GENERATOR



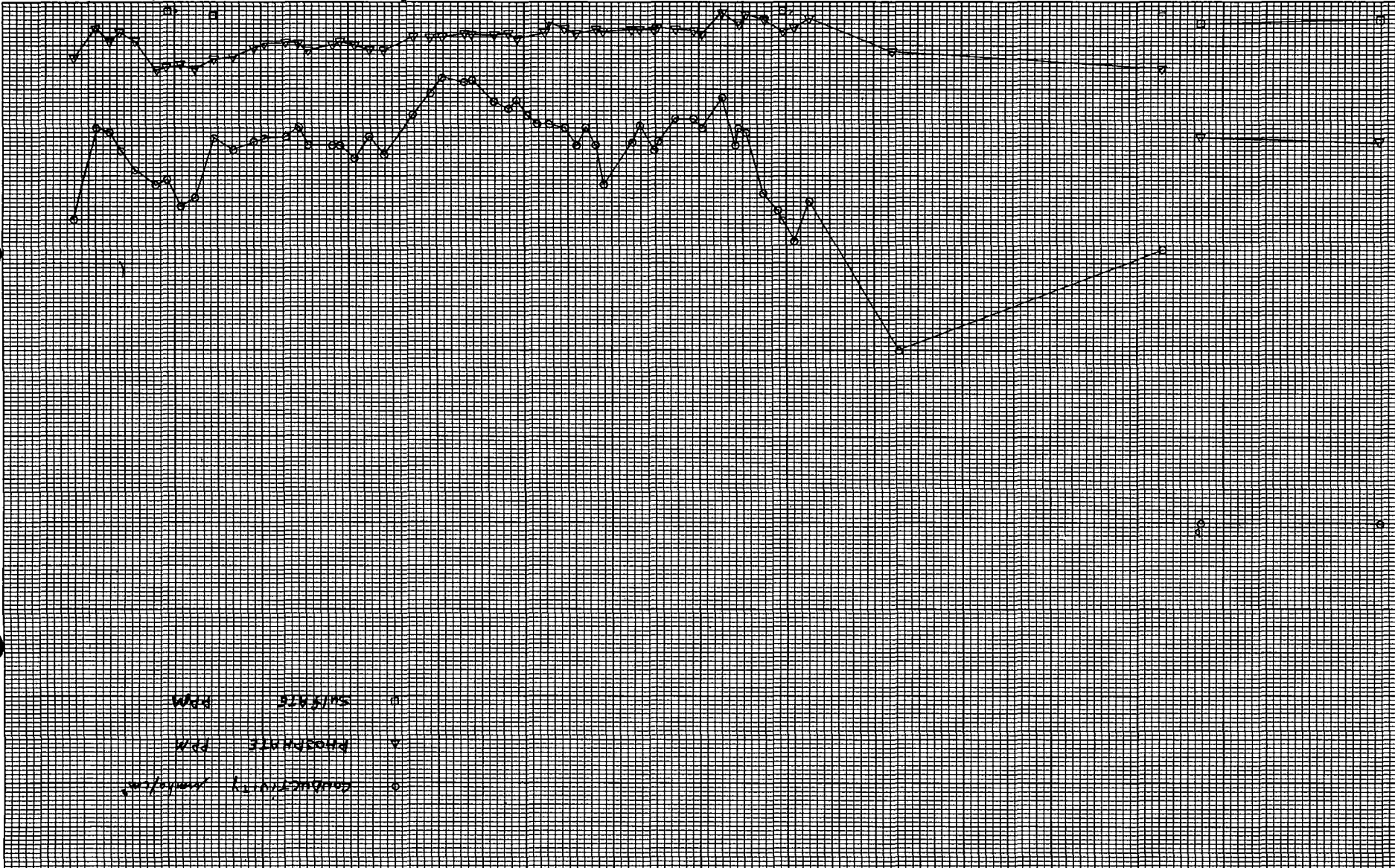
DECEMBER 1974

'B' STEAM GENERATOR

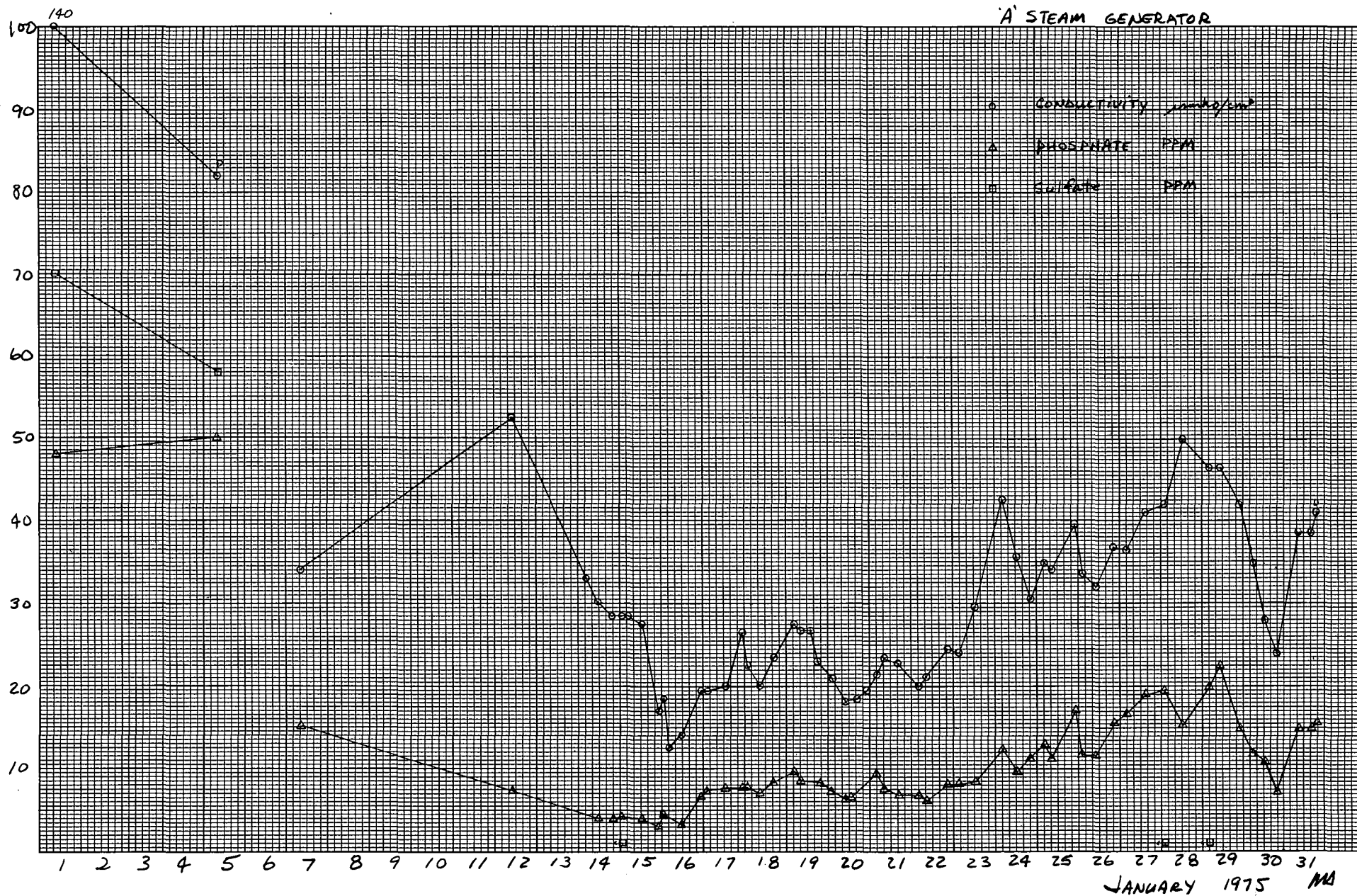


GM 5161 JANUARY 1975

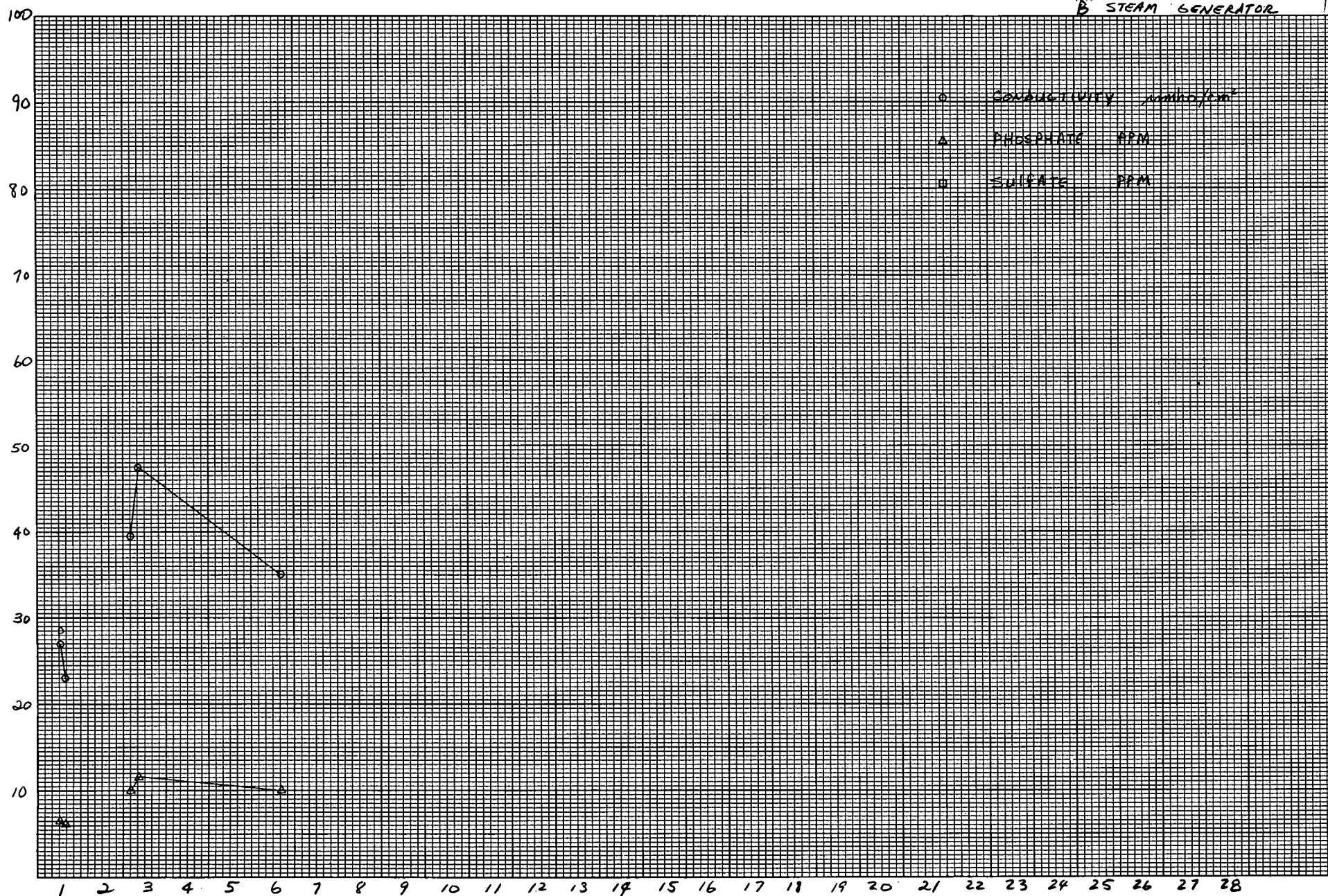
18 08 62 82 22 27 28 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1



'B' STEAM GENERATOR



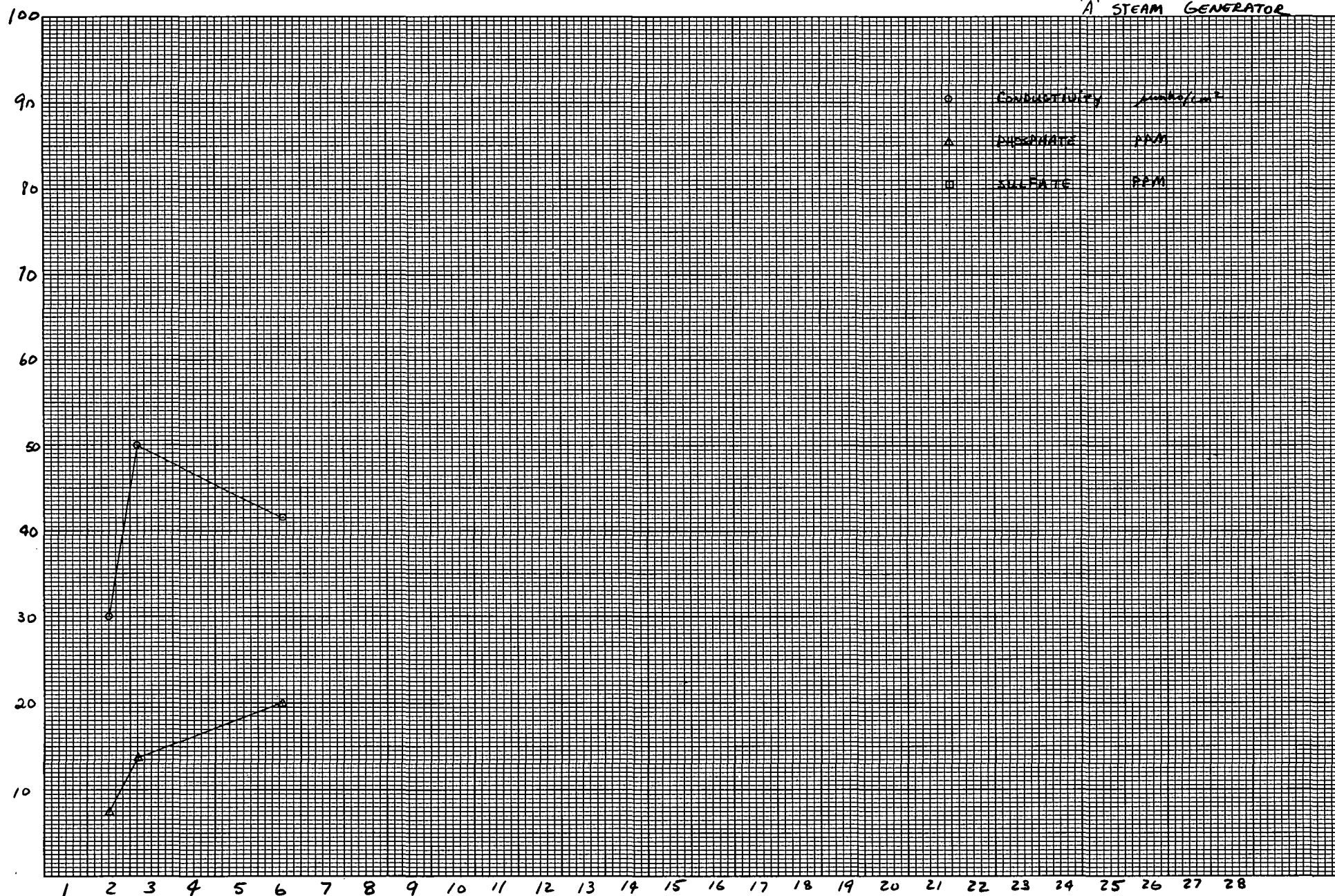
'B' STEAM GENERATOR



February 1975

ms

'A' STEAM GENERATOR



February 1975 WA