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April 13, 1979

MEMORANDUM FOR: V. Stello, Jr., Director, TMI Operations

FROM: F. J. Miraglia, Jr., Coordinator, Team B

SUBJECT: ADVISORY ON EFFECT OF LOSS OF RECOMBINER OPERATION ON HYDROGEN CONCENTRATION IN CONTAINMENT

The attached subject advisory is provided for your information, and was prepared by Jack Kudrick.

/s/

F. J. Miraglia, Jr.
Coordinator
Team B

Attachment:
As Stated

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Hydrogen Concentrations Within the Containment

At 0115 on April 13, 1979, the AI recombiner heater assembly failed. As a result, there is no recombiner currently in operation at the site. We have performed a number of COGAP runs to determine the hydrogen increase in the containment due to radiolysis to determine if recombiners are still required. As a result of these analyses, we find that the hydrogen production rate due to radiolysis, is very small. The calculated hydrogen production rate will yield only an increase of about 0.12% in hydrogen concentration within the containment over the next five days. Therefore, it will take over 40 days for the concentration to increase by one volume percent due to radiolysis. Based on these calculations, we therefore conclude that radiolysis is sufficiently low to preclude any near term requirements for recombiner operation.

We have also investigated the potential hydrogen source term due to metal corrosion as well as coating decomposition. Based on all the available data, there is no indication that any measureable amount of hydrogen will be generated within the containment. This is due to the low temperatures (i.e., less than 100°F).

There is, however, a concern relative to the significant variations in measured hydrogen concentration in the containment to date. Based on information available, in the form of daily data summary charts, (see enclosed figure) we note a rather wide cyclic variation in hydrogen concentrations. These variations cannot be accounted for due to radiolysis or metal corrosion or recombiner operation.

Based on an average H_2 concentration of 2.0% it would take approximately 30 hours of recombiner operation to reduce the concentration to 1.9%. There are several possibilities as to why these variations are occurring. One possibility is due to instrument error. Other possible reasons are due to short-term local gradients caused by introduction of significant quantities of hydrogen from either the gas decay tanks or from venting of the primary system. A final possibility could be the presence of significant hydrogen stratification within the containment. This latter possibility is felt to be remote since three fan coolers have been in operation for several days. The forced circulation caused by the running of these fans should be more than sufficient to homogenize the containment atmosphere. This is further strengthened by the fact that the containment temperatures are rather uniform.

To properly assess the potential of short-term gradients in the containment due to introduction of hydrogen from either the gas decay tanks or the primary system, we will need the following information.

1. The specific times and duration of the gas decay tank venting into containment.

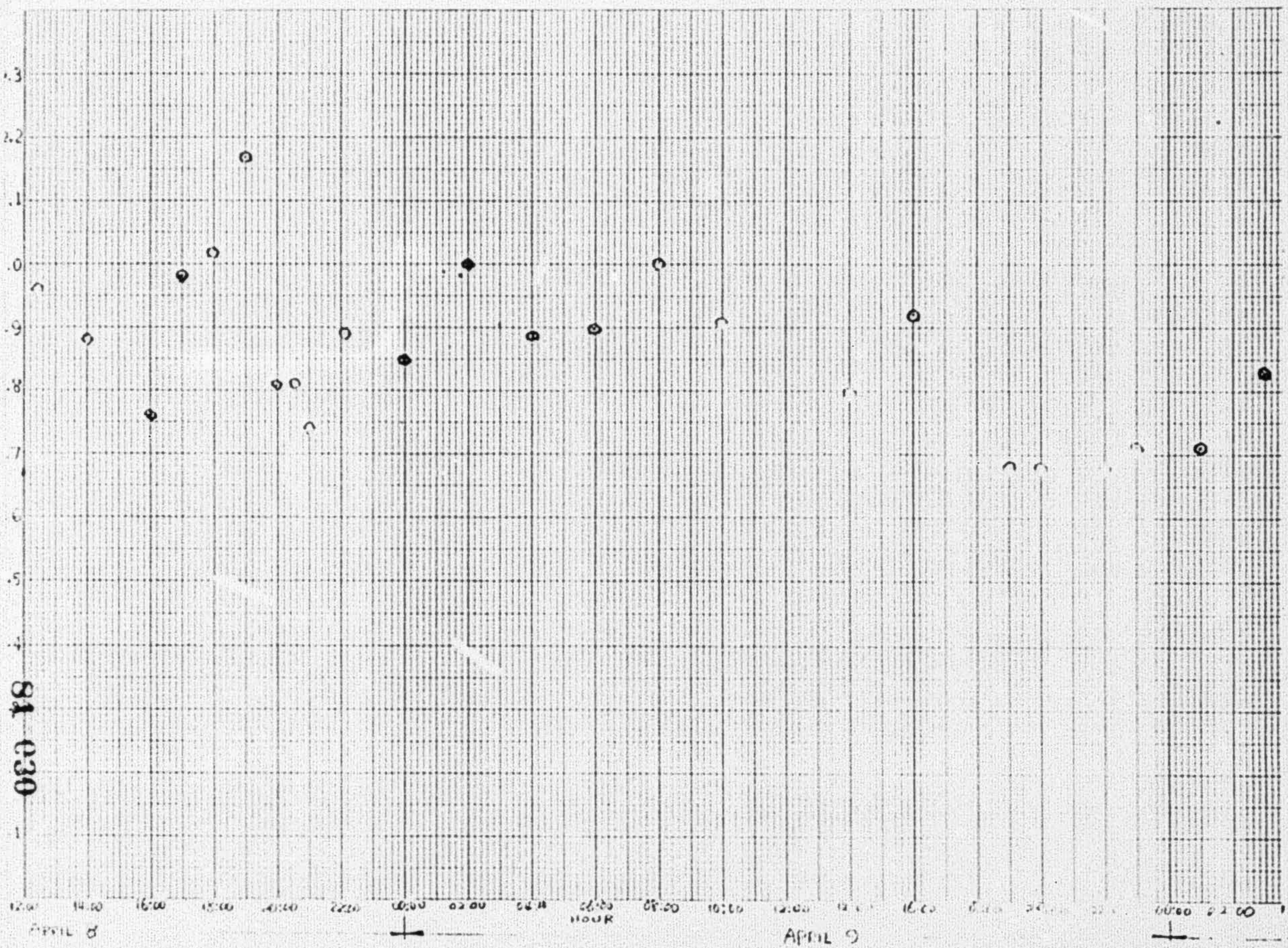
2. The estimated hydrogen source strength associated with each venting, if available (i.e., cubic ft of hydrogen introduced into containment).

3. The time and duration of pressurizer venting to the containment.

4. Estimates of hydrogen release, if available.

5. Location of sample points.

It should be stressed that at the present time it is our belief that the hydrogen variations as measured cannot be accounted for due to any assumed generation rates due to radiolysis or metal corrosion. Therefore, it may be measurement error or local transient gradients due to hydrogen addition. To fully explain the possibility of significant hydrogen concentration variations within the containment, we will need the above information to properly assess the effects of short-term hydrogen releases into the containment.



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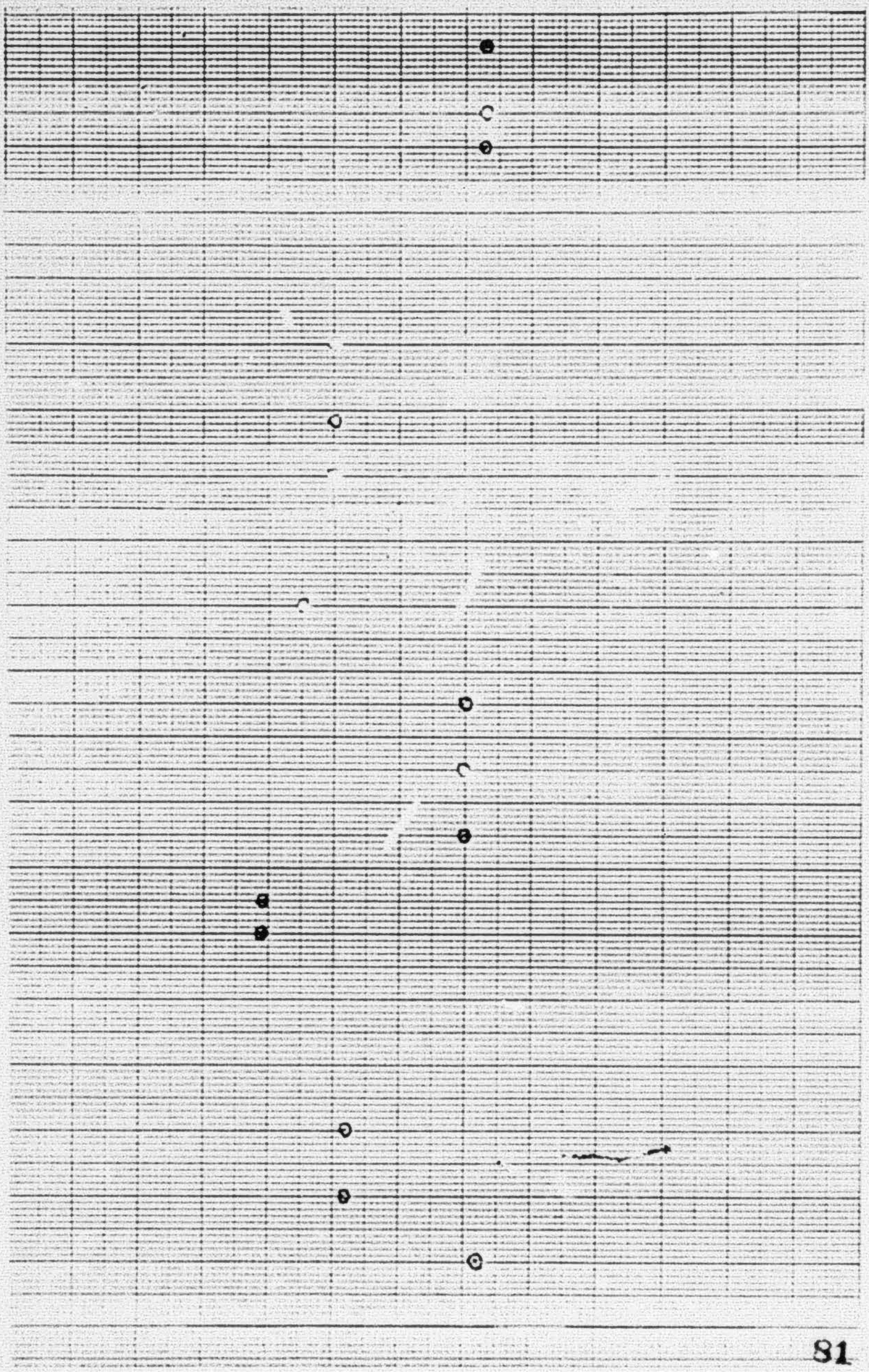

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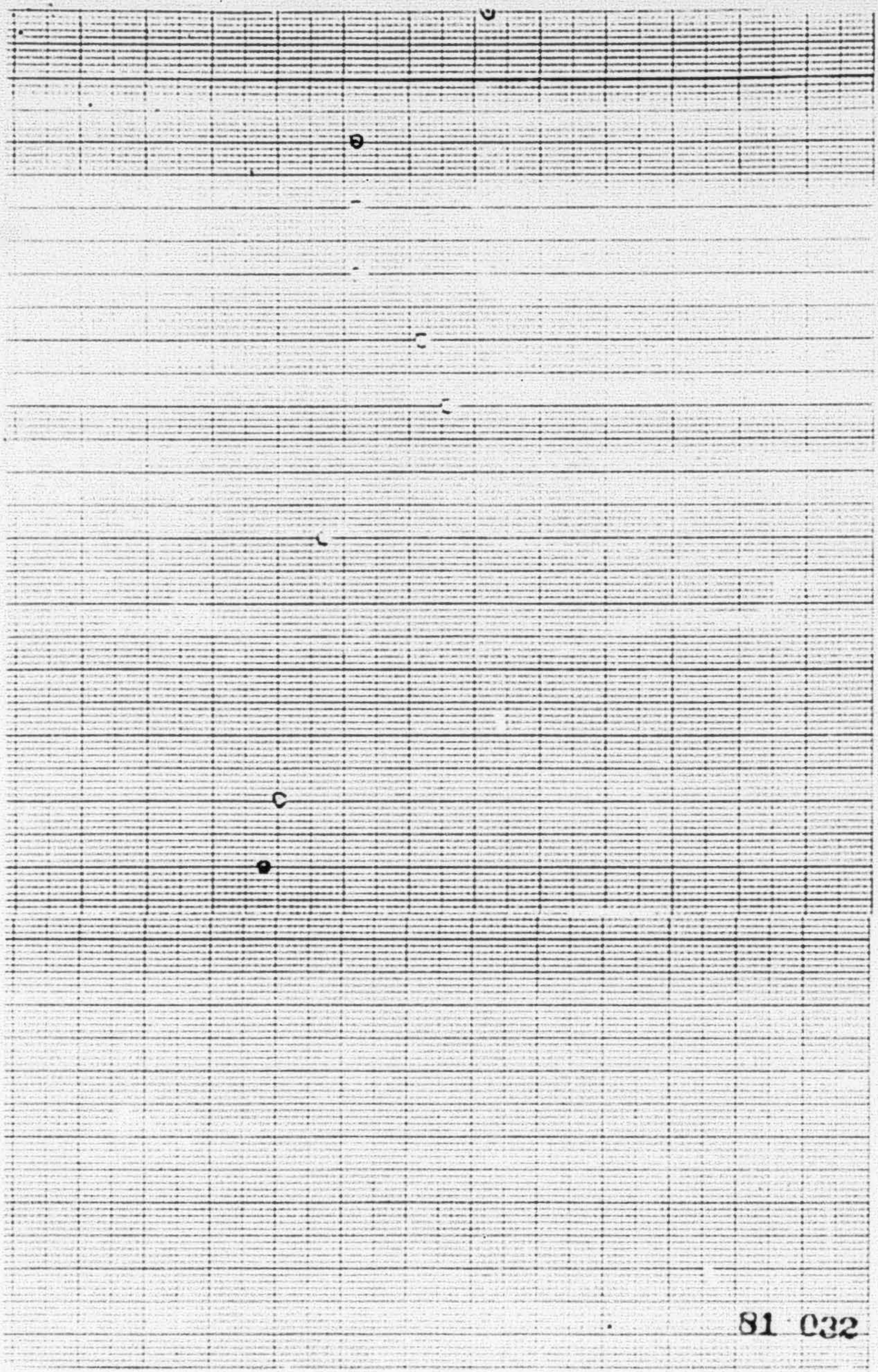

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