

# Lawrence Berkeley National Laboratory

## Recent Work

### Title

MINUTES OF MEETING OF MTA REVIEW COMMITTEE HELD MAY 22, 1951

### Permalink

<https://escholarship.org/uc/item/6bs002kk>

### Author

Fleckenstein, E.D.

### Publication Date

1951-05-01

UNIVERSITY OF CALIFORNIA - BERKELEY

~~SECRET~~

UCRL-1314

~~CAUTION~~

C2

This document contains information affecting the National Defense of the United States. Its transmission or the disclosure of its contents in any manner to an unauthorized person is prohibited and may result in severe criminal penalties under applicable Federal laws.

~~RESTRICTED DATA~~

This document contains restricted data as defined in the Atomic Energy Act of 1946. Its transmission or the disclosure of its contents in any manner to an unauthorized person is prohibited.

DECLASSIFIED

TWO-WEEK LOAN COPY

This is a Library Circulating Copy  
which may be borrowed for two weeks.  
For a personal retention copy, call  
Tech. Info. Division, Ext. 5545

RADIATION LABORATORY

UCRL-1314  
C2

## **DISCLAIMER**

This document was prepared as an account of work sponsored by the United States Government. While this document is believed to contain correct information, neither the United States Government nor any agency thereof, nor the Regents of the University of California, nor any of their employees, makes any warranty, express or implied, or assumes any legal responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by its trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof, or the Regents of the University of California. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof or the Regents of the University of California.



~~SECRET~~

UCRL-1314  
Technology - Materials  
Testing Accelerator

UNIVERSITY OF CALIFORNIA  
RADIATION LABORATORY

Contract No. W-7405-eng-48

CALIFORNIA RESEARCH & DEVELOPMENT COMPANY

Contract No. AT(11-1)-74

CLASSIFICATION CANCELLED  
BY AUTHORITY OF THE SAN MTA  
DOCUMENT REVIEW COMMITTEE.

ON \_\_\_\_\_  
DATE SIGNATURE

MINUTES OF MEETING OF MTA REVIEW COMMITTEE MEETING  
HELD MAY 22, 1951

E. D. Fleckenstein

RESTRICTED DATA

This document contains restricted data as defined in the Atomic Energy Act of 1946. Its transmittal or the disclosure of its contents in any manner to an unauthorized person is prohibited.

CAUTION

This document contains information affecting the National Defense of the United States. Its transmission or the disclosure of its contents in any manner to an unauthorized person is prohibited and may result in severe criminal penalties under applicable Federal laws.

CLASSIFICATION CANCELLED  
BY THE SAN MTA DOCUMENT  
REVIEW COMMITTEE.

7-31-57  
DATE

GLEN WATSON  
FOR THE COMMITTEE

Berkeley, California

~~SECRET~~

STANDARD DISTRIBUTION: Series A

Copy Numbers

|   |       |
|---|-------|
| Atomic Energy Commission, Washington          | 1-5   |
| Chicago Operations Office                     | 6     |
| Patent Branch, Washington                     | 7     |
| Technical Information Service, Oak Ridge      | 8-12  |
| University of California Radiation Laboratory | 13-30 |

RESEARCH SERVICE BRANCH  
Atomic Energy Commission  
Berkeley Area  
Berkeley, California

MINUTES OF MEETING OF MTA REVIEW COMMITTEE MEETING  
HELD MAY 22, 1951

Present: UCRL: Alvarez, Brobeck, Cooksey, Farly, Lawrence, Lofgren,  
Longacre, McMillan, Panofsky, Reynolds, Thornton

CR&D: Cope, Hildebrand

AEC: Fleckenstein, Moore

Lawrence summarized recent discussions on the A-12, outlining the program which will now be followed and also indicating reasons for the changes from the previous plans. An engineering study of the use of 20 megacycles will be made as well as continuing the engineering studies of 12 megacycles for A-12. Construction for A-12 will be held in abeyance pending results from the MTA, expected to be available by the end of this year.

The reasons for considering 12 megacycles for the original design of A-12 are: (1) The rf power is more easily obtained at 12 than at 20 megacycles. (2) The aperture considerations were such that it did not appear possible to inject high current beams in the largest aperture then considered usable for 20 megacycle operation. It has now been shown that an injection aperture of 6.73 inches and 20 megacycles with 300 KV injection voltage is possible. (3) It is now shown that the X-ray loading can be reduced in test cavities and it is felt that the same results are possible for the MTA and A-12 machines. This reduction in X-ray loading over previous considerations allows higher electric fields to be held, permitting a shorter tank and thus making the use of 20 megacycles more feasible. (4) It was originally thought that the lower frequency would be necessary to combat mode problems but it has been shown that uniform field distribution can be obtained at the higher frequency of 20 megacycles. (5) It has also been found possible to design focusing magnets for a 300-KV input. Injection for 20 megacycles need not be higher than this; hence, designing for this frequency is feasible.

Lawrence stated that in addition to carrying on simultaneous engineering studies of both a 20- and a 12-megacycle machine a third engineering study should be made to design the A-12 making less conservative assumptions on all of the present unknowns. The design should be based on such assumptions as: 1/2 Mev per foot gradient; good focusing as possible with little scattering; resnatron development which will produce 10 megawatts per tube; feasibility of steam jet pumps; a tritium target; safety factors reduced to a minimum. Such a design will be compared

with the other two more conservative designs.

In answer to questions from those present, Lawrence gave the following additional details in carrying out the engineering studies as now visualized: For the 20-megacycle machine a beam current of 100 milliamps should be considered and for the 12-megacycle a beam current of 500 milliamps should be considered. It is to be understood that the 100 milliamps is not an upper limit on beam current for the 20 mc machine; however, it is a reasonable value for design consideration. On the question of PW or CW it would appear that PW should be favored for the 20-megacycle machine. As for the target, the design should be for tritium production only. (Since the separation of tritium from hydrogen even at low concentrations is believed to be an easy matter, the question of flux density in the target should be no problem. The injection voltage should be considered as 300 kilovolts; however, this is not a firm figure but one which is known to be feasible. It is known that an injection voltage higher than that presently considered for the 12-megacycle machine is required. In any comparisons to be made between the 20-megacycle and the 12-megacycle cases the difference in currents will be taken into account and costs will be based on machines of equivalent output.

Cope explained the present policy under which CR&D is operating. As of last fall there was a directive for the A-12 machine to expend not greater than \$10,000,000 in the design and procurement program. Recent instructions are that procurement for this machine will be stopped; however, the research and the engineering design is to continue on the same scale. CR&D has taken this to mean, and has so stated to the Commission, that there will be no cancelations of present obligations, that no further commitments will be made for procurement, and that the L-2 will proceed as scheduled. CR&D is preparing to submit a budget which will approve once and for all a lump sum of money for research for the A-12 machine. The directive last fall allowed 5 million dollars for research, whereas recent estimates indicate 7.7 million are necessary. Lawrence pointed out that the curtailment of procurement was the joint suggestion of CR&D and the Radiation Laboratory because of the rapid increase in costs. Cope stated that CR&D desires a lifting of the curtailment for procurement of a few items, such as preliminary work on the site and long-term delivery material.

Brobeck stated that the present planning is for the MTA to be started with the existing oil pumps using Myvane oil and freon cooled baffles.

General discussion on the spongy aluminum spraying in the MTA tank and the possibility that this coating may become contaminated with oil thereby leading to contamination of the drift tube surfaces under poor vacuum conditions, produced the conclusions that during the



~~SECRET~~  
-5-  
**DECLASSIFIED**

vacuum testing to be accomplished in the near future only the oil diffusion pumps in a favorable position with respect to the present liquid air baffles should be used. Every effort should be made to avoid operating the diffusion pumps in the pressure range in which back-streaming of oil occurs. Cope agreed that CR&D would put aluminum-sprayed test samples in the tank during the vacuum tests and that a check for oil contamination would be made to determine the effectiveness of this procedure.

Brobeck stated that it has been decided to omit heating of the drift tubes in the MTA, the A-12, the long drift tube test cavity, or the L-2 test cavity and, unless objections are now raised, these designs will be carried out. It was agreed that the above provisions is satisfactory.

Alvarez suggested that the present design of the L-2 test cavity should be so made that it can run at 20 megacycles as well as 12 megacycles. Farly stated that this could be accomplished by either enlarging the stems or shortening the cavity. Hildebrand agreed that this operating frequency would be taken into consideration in design.

Brobeck brought up the question of installing liquid nitrogen baffles in the MTA after the vacuum testing has been completed and also the consideration that mercury pumps may be used with these baffles. Hildebrand stated that the only material readily available from which these baffles could be made is stainless steel and that a bid has been received indicating \$140,000 total cost for building and installation. Alvarez inquired about the use of copper and, although Cope indicated that copper was not readily available, Reynolds thought that the necessary amount could be obtained. Hildebrand stated that CR&D will check the availability of copper as compared with stainless steel. The stainless steel baffles will be made unless a significant saving in time is realized by the use of copper. Lofgren suggested that a possible alternate, if mercury pumps were to be used, would be the chrome plating of the copper baffles. However, there was some doubt as to the ability to do a completely satisfactory chrome plating job on such odd shapes as the baffles will be.

Lofgren reported on the present progress of mercury pumps and stated that CR&D and UCRL pump groups have successfully converted a 20-inch oil diffusion pump to a mercury pump and that at the present time there is in the shop a conversion of a standard 32-inch oil diffusion pump to mercury. It seems reasonable that the 32-inch mercury pump will operate with about 1/2 the pumping speed of the same size oil diffusion pump. Cope stated that DPI will quote on a 32-inch mercury pump which guarantees 1/2 the pumping speed of a similar oil diffusion pump.

Brobeck announced that the next meeting of the review committee will be held at Livermore at 1:00 p.m. and, in the future, meetings will alternate between Berkeley and Livermore at a 2-week interval. All meetings will start at 1:00 p.m.

SECRET



DECLASSIFIED

~~SECRET~~