

M-153

MARK IV REDESIGN COMMITTEE

MINUTES OF MEETING NO. 6

November 12, 1959

In attendance: F. Adams, B. Bunker, A. Crabtree, P. Edwards, D. Goerz,
O. Kraus, G. Loew, R. B. Neal, R. Sund, P. Zinder

I. Discussion

The over-all outline drawing of the accelerator was laid out on the table and the following items were discussed by the members present:

- a. The mounting system, in respect to the single versus the double support on each pedestal.
- b. The manifold system. The drawing illustrated a 12-inch diameter steel manifold to be mounted approximately 6 feet above the floor and supported at three points.
- c. The diffusion pumps for the high-vacuum system, types and sizes.
- d. The present klystrons, comments concerning 5 centimeter oscillations, the feasibility and possibility of changing the pump-out window to aid in eliminating this oscillation. Also, Dr. Neal told us that Dr. Lebacqz has a new klystron tube under development that is estimated will be ready in one year and it will not have any 5 centimeter oscillation.
- e. The accelerator water jacket. Information has been obtained by Mr. Goerz from the Elco Manufacturing Company in Berkeley that they can supply us with a stainless steel tubular jacket that would be bored twice and honed. The SS tubes will have a tolerance of ± 0.003 inches on the diameter, and ± 0.005 inches in the straightness of the tube over the entire 10-foot length. For an experimental section of

two 10-foot sections, it will cost us \$68.50 per foot. If this method is to be used on the production of Project M, he has a price quotation of \$54.00 per foot for the production item.

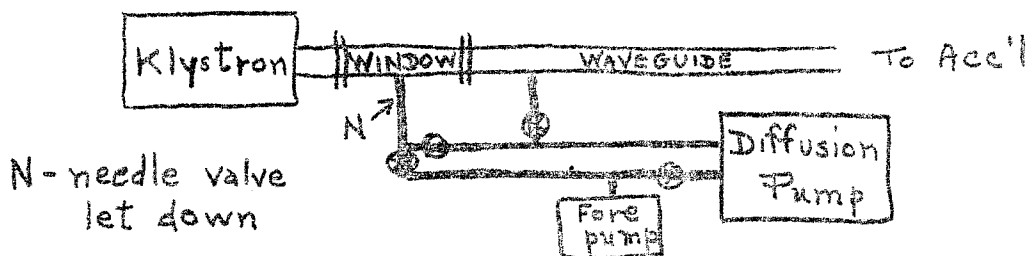
Comment: It should be conceivable to use the bored and honed tubes at \$68.50 per foot for the two 10-foot sections on Mark IV, switching to the mill run from the manufacturing point for the Project M, with very little change in tolerances.

- f. Expansion diaphragm. Discussion on the method of inert gas welding the diaphragm on the water jacket with respect to Drawing No. M-1001; decision to use one convolution of Ni to connect water jacket.
- g. Spiral support. To intentionally make the spiral slightly egg-shaped. This would, in turn, apply pressure to the accelerator tube when it is mounted in the stainless jacket giving it support over the entire length.

h. Tuning.	<u>Opinion</u>
1. Is tuning necessary after assembly -	Yes
2. Should 2 or 4 tuning points be used -	2 necessary & suff.
3. Could a diaphragm type screw be used -	No
4. Should tuning screws protrude beyond water jacket -	No
5. Tune with a pronged device -	Yes
6. Plugholes with tapered brass plugs -	Yes

II. Proposals

- a. By Mr. Goerz. A proposal to use a 2-inch diffusion pump, the MCF 60 with a dry trap to pump the window and waveguide at the first and second klystrons. This would be located similar to the following arrangement:



N - needle valve
let down

Valve size will be decided by the next meeting.

- b. By Mr. Bunker. To change the water recirculating system from galvanized pipe to copper pipe in the Mark IV system when we start the changeover on Mark IV.

III. Decisions

- a. Accelerator support system. To use a single point support for each of the stands. Also, in order to make it similar to Project M, all adjustments would be plus and minus 6 inches, laterally and vertically.
- b. High-vacuum manifold system. The basic drawing as presented today utilizing a 12" steel manifold (Fabricated of four 10-foot sections welded in place) located approximately 6 ft. above the floor in the trench. Tube will be supported at three points.
- c. High-vacuum pump system. Two 6-inch nominal (PMC-1440) diffusion pumps will be located at the gun end of the accelerator trench.
- d. Tuning screws. We will use the adjustable tongs for 2 point tuning in each cavity of the accelerator. This would be done through a tapered hole which would be sealed by a tapered brass plug after the tuning has been accomplished. This also leaves the possibility open

for removing the plug and retuning if necessary at a later date. The water jacket will be made approximately 1/16" diameter oversize, allowing the accelerator to rest on the coils each $1\frac{1}{2}$ " on the bottom of the water jacket. Reference points for alignment of the accelerator will be located on the water flanges at the end of the jacket that are rigidly attached to the accelerator structure.

- e. The diaphragm on the water jacket will be a straight, rigid joint and inert gas welded while the accelerator tube is in the horizontal position.
- f. The water jacket, costing \$1,370 as quoted by the Elco Manufacturing Co., is satisfactory and acceptable as far as the price is concerned.

Planning will continue on this basis.

IV. Items to be Accomplished at the Next Meeting

- a. Dr. Neal has requested that we make up a layout of the upstairs portion, in order to check into the feasibility of moving equipment around in order to make better location for the equipment upstairs and downstairs.
- b. The detailed design work on the accelerator support adjusting mechanism.
- c. The rigid jacket with provision for tuning at each cavity 180° apart.
- d. Decision as to how much clearance is necessary in order to get the accelerator tube into the jacket.
- e. The method of alignment for the accelerator; external versus boresighting or a combination of the two.

Comment: It is felt that external will be certainly the preferable one.

The next meeting is scheduled for November 19th at 10:30 A.M.