Mark IV Redesign Committee

Minutes of the Meetings No. 1 and No. 2

Oct. 22 and 23, 1959

In attendance - A. Crabtree, P. C. Edwards, D. J. Goerz, G. Loew, R. B. Neal

The following were decided:

The purpose of the Mark IV reconversion—to produce a preprototype machine of the Project M linear electron accelerator. The conversion will take place in three steps.

Step I.

1. Change of present accelerator tube to $2\pi/3$ electroformed structure.
2. Copper waveguide will be installed, and the waveguide will be attached from the vertical direction.
3. Rigid water jacket will be incorporated, Cal-rod or equivalent heating will be used.
4. Center line will be raised one foot and shifted one foot to give more area in the straight ahead beam for experimentation, providing better access to the beam in the end station for use by the medical group.
5. Self-ridged copper gaskets, both circular and rectangular, will be used throughout.
6. Valves
   a. 1" metal valve for use in guard vacuum line; seal, self-ridged copper gasket.
   b. An adaptable metal or teflon 3" valve for the main vacuum system will be used. The metal seal would be of the expanding disc variety.
   c. An in-line accelerator valve adaptable either to a neoprene O-ring or self-ridged copper gasket will be used.

7. Rotary seals will be made by means of a bellows at right angle.

8. Pumping system

   a. 150 liter vacion pumps located in three positions or a zeolite trap with oil diffusion pump.

   b. The oil diffusion pumps used will be the new PMC 720 in two locations and a PMC 115 at the input end.

9. All magnetic materials must be avoided in the vicinity of the accelerator proper to provide for a new type degaussing system.

10. Directional couplers will be the conventional slot type or of a new Varian type which is to be investigated.

11. All components are to be easily adapted to experimental use,

   a. Proper coupling coefficients will be decided at the next meeting.

Stage II. Late 1960.

A flexible waveguide to join the accelerator and the connecting waveguide system will be developed and installed, also a flexible waveguide will be installed between the klystron and the accelerator proper. This waveguide may be a transition from rectangular to circular TE_{01} mode and back to rectangular with a bellows in the TE_{01} mode. The all metal system is to be completed. Initial baking of the system at 250° will be carried out.

Stage III. Early 1961.

High power components will be installed

1. New klystron
2. Modulator
3. Power supply
4. High current gun
5. Hollow cathode gun

Reconversion Schedule.

A. Structure.

To be completed March 1, 1951

B. Machine Test.

1. Present machine.

Jan. 15 - Mar. 1

Purpose - Repeat important experiments on beam transmission and peak energy, etc.

2. New machine.

May 1 - May 30

Purpose - Tune up and compare operation.

C. Design - Stage 1.

1. Basic design freeze - Jan. 1, 1959.

2. Detail freeze - Feb. 1, 1959.

D. Installation - Machine shut down.

March 1 - May 1

Next meeting - Oct. 29, 1959

Time - 10:30 a.m.