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UNIVERSITY OF CALIFORNIA — BERKELEY

RADIATION LABORATORY

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Form AEC-94
(March 19, 1947)

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AB-1073 UCRL-884

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MINUTES OF MTA PROGRESS MEETING
TUESDAY, AUGUST 29, 1950

Present: UCRL: Alvarez, Brobeck, Gordon, Latimer, Lawrence, Lofgren, Longacre, McKissen, McMillan, Panofsky, Richardson, Sewell, Thornton, Twitchell, Wallace

CRDC: Gaylord, Hansen, Hildebrand, Kent, Powell

G.E.: Westendorf

AEC: Ball, Fidler, Fleckenstein, Ott, Platt

Gordon presented in considerable detail several aspects of the design of the drift tubes and related items. He outlined the design for the support of the focusing magnets, means for lowering them onto trucks for removal and means for making and breaking water and power connections to them during their installation and removal. He illustrated by means of a rough sketch of the No. 5 drift tube the manner of housing the magnets and the mounting of flux leaders. He said that provision is being made for the removal of a total 1.5 megawatt heat load which might result from electron bombardment. The cooling tubes on the end faces of each drift tube are being spaced on the basis of the gap length, the assumption being that this heat load will increase with the gap length. Calrod heaters are also to be installed on the inner surfaces of the drift tubes at both ends to permit them to be heated to 250-300° C under vacuum before operation to evaporate the oil film which is thought to be responsible for the high field emission by copper. No provision is being made to allow the drift tubes to run hot during operation of the accelerator since to do so would require a six weeks' delay for redesign of connections and gaskets. To allow the drift tubes to attain thermal equilibrium without cooling would result in local overheating and would not heat the proper areas to suppress field emission.

McMillan asked if excessive field emission would recur if the drift tubes are not run hot. Alvarez said that the report of Turner at Brookhaven indicated a return of X-ray background in their Van de Graaff when heating was discontinued but that tests here in Building 10 have shown the improvement in field emission persists essentially unchanged for an hour or more after heating was stopped. Alvarez and Panofsky were of the opinion that a recurrence of heavy field emission is improbable and that if it should occur we are providing a tangential magnetic field which should handle the problem anyway. For this reason it was decided that the delay to provide

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for the drift tubes to run hot is not warranted.

Gordon said the cooling of the drift tubes is being designed for a 10° C temperature rise of the cooling water and for a rather low pressure drop. Should it become necessary the cooling capacity can be increased by a factor of ten by doubling the flow rate (for which adequate pressure is available) and increasing the temperature rise to 50° C.

Gordon illustrated the design of copper liners for each of the drift tubes which can be removed and discarded if they should become too radioactive. He pointed out the difficulty of providing for expansion of the first half drift tube which is mounted on the liner. Panofsky suggested omitting heating of the first half drift tube if its engineering is too cumbersome.

Panofsky said that it might prove desirable to install ion catching electrodes in the tank to allow the attaining of the required field gradients without multipactor locking.

Brobeck said the RCA-5831 tube has now been installed in the oscillator in Building 52 and testing should begin within a few days.

Lofgren said that they have now measured his ion beam by a thermal method and have obtained readings about 20-25% higher than when using a biased collecting cup. He said that measuring the beam by using a transformer method gave readings higher by a factor of two than the Faraday cup. The transformer method has the advantage of allowing measurement of the beam without stopping any of it and it is planned to calibrate this method and use it on the full scale ion source to monitor the beam. He said their best beam to date is 900 ma. This is for 1 ms pulses at the rate of 1/sec. (The Mark I source will operate with 25 ms pulses at the rate of 8/sec. There is thus a factor of 200 between these duty cycles.) He said the full-scale ion source will be built in Building 51 (the Bevatron building) since laboratory facilities for this work will not be available at Livermore in time.

Richardson said that the top pole piece for the electron accelerating model of the high current cyclotron is due to be delivered by tomorrow. He said the dee has been changed from 120 to 180 degrees to eliminate a possibility of precession of the beam.

Longacre said the electron accelerating linac model should be completely assembled this week.

Russell H. Ball

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