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Publication Date

1951-08-14

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CALIFORNIA RESEARCH & DEVELOPMENT COMPANY
Contract No. AT(11-1)-74

MINUTES OF MEETING OF MTA REVIEW COMMITTEE
HELD AUGUST 14, 1951

Russell H. Ball

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RESEARCH SERVICE BRANCH
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MINUTES OF MEETING OF MTA REVIEW COMMITTEE
HELD AUGUST 14, 1951

Present: UCRL: Alvarez, Aamodt, Brobeck, Cooksey, Latimer, Lawrence, Lofgren, Longacre, Norton, Panofsky, Reynolds, Thornton, Twitchell, Van Atta.

CR&D: Avery, Cope, Hildebrand, Kent, Mayer, Powell, Stemen

AEC: Ball, Fidler, Fleckenstein

Alvarez said that shot peening of test panels of sprayed aluminum with 14 mil steel shot has produced a surface which appears to be entirely satisfactory for use in Mark I. Test panels which have undergone this treatment have been tested in Nunan's cavity (B2) and have produced an X-ray level equal to or less than the best obtainable with the bare steel tank of this cavity. As a preliminary to this test air was recycled several times through the cavity so as to stir up any dust. Alvarez says it is now recommended that this shot peening treatment be used for the entire aluminum surface of Mark I since the type of measurement in Nunan's cavity which was the original basis for ruling the present coating unacceptable, has now shown the shot peened surface to be satisfactory.

Avery said the estimated cost of shot peening in the Mark I tank is \$90,000 to \$100,000. The operation is expected to require about twenty-five working days on a three-shift basis. Powell said that the shot peening appears to be the best alternative from the standpoint of cost and time. Mayer said that all of the necessary equipment for this operation including that necessary equipment to clean the steel shot is available locally.

Hildebrand said that it will cost about \$30,000 to install the sheet copper curtain necessary to permit separate pumping of the regions interior and exterior to the liner. He outlined the present design for the curtain including the provision to prevent the establishment of a hazardous differential pressure on the liner. He said no estimate is yet available on the time delay for this modification. Lawrence stated his opinion that this curtain should be installed at this time. Brobeck questioned the necessity of shot peening the entire area external to the liner in view of the decision to install curtains to permit the separate evacuation of the region between the shell and liner. However, it was the consensus of the discussion that followed that the entire tank surface should be shot peened.

Mayer outlined the present status of tank weld repairs. He said the vessel was closed at noon today after having spent considerable time repairing the circumferential weld on the East head. The new welding had cracked in several places during evacuation of the vessel last Sunday. It was found necessary to replace a steel panel 16" x 36". Strain gauges have been placed

radially and circumferentially on this weld and information on its behavior should be known by tonight. He stated that the recent cracking has been confined to the rewelding done to repair the original fault.

Alvarez said we have traced a lot of our difficulties with electron emission to oil layers on surfaces exposed to high electric fields. It has become a general experience with both rf and dc equipment that one can decrease emission currents from such surfaces by eliminating the oil vapor from the vacuum system. Evidence indicates that the sparking rate also decreases when the electron emission is reduced. He said for these reasons we are now recommending a changeover of the present diffusion pumps from oil to mercury. Avery said the cost for this changeover, exclusive of the investment costs for the mercury, would be on the order of \$200,000. He recommended, and Lawrence concurred, that we should conduct initial operation with the present liquid nitrogen trapping system until such time as we can install a two-stage freon refrigeration system for -100° F. Panofsky questioned the advisability of raising the temperature of the trapping system from that of liquid nitrogen to CO_2 , and asked if consideration had been given to the long term transfer of mercury to the aluminum and copper surfaces within the vessel. It was the consensus that such transfer would be slow at CO_2 temperatures and that no difficulty would be expected even should a substantial transfer occur. Avery guessed that the changeover of the pumps would take approximately three months with a net loss in the Mark I schedule of one month. Powell recommended that the adjustment to the Mark I schedule resulting from this delay, be confined to as few items as possible in order that we may eliminate as far as possible the last minute rush on completion of critical components.

Avery said that DPI has expressed an interest in contracting for making the changeover of the diffusion pumps. He said DPI has indicated their opinion that the performance of the mercury pumps should equal and may exceed that of the present oil pumps. DPI plans to renovate the present jets and to install new baffles and condensors. It is expected that the major effort in the changeover will be concerned with the installation of the baffles and condensors. Brobeck said it appears wise not to use oil booster pumps with the mercury diffusion pumps for fear of introducing oil into the vacuum system. It is therefore planned to use only Kinney pumps for this purpose. This modification will result in an increase in pump down time of about four hours.

Avery said that NRC uses mercury pumps against a backing pressure of 300 microns. Lofgren said it should be possible, with mercury pumps designed for the purpose, to work against pressures higher than this.

Aamodt said that the presence of a high X-ray level and large numbers of stray and secondary electrons in the region of the Mark I target is expected to produce sufficient ionization current to render impossible the measurement, with the presently designed current measuring target, of the small beam currents that are expected to be encountered during the early operation of Mark I. It is therefore recommended that a simple water-cooled cup be installed, the entrance end of which will extend into the field of the precessing magnet. This arrangement will prevent the entrance into the current measuring cup of stray ions and electrons and will prevent the escape of secondary electrons within the cup and should thus permit accurate measurement of low beam currents during the initial de-bugging operation.