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UCRL-1424
Technology - Materials
Testing Accelerator

UNIVERSITY OF CALIFORNIA
RADIATION LABORATORY
Contract No. W-7405-eng-48

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Contract No. AT(11-1)-74

MINUTES OF MEETING OF MTA REVIEW COMMITTEE
HELD JULY 31, 1951

Russell H. Ball

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RESEARCH SERVICE BRANCH
Atomic Energy Commission
Berkeley Area
Berkeley, California

MINUTES OF MEETING OF MTA REVIEW COMMITTEE
HELD JULY 31, 1951

Present: UCRL: Brobeck, Latimer, Lawrence, Lofgren, Longacre, Reynolds, Twitchell

CRDC: Avery, Brighton, Hansen, Hildebrand, Kent, Powell, Stichka

AEC: Ball, Campbell, Derry, Fidler, Fleckenstein

Hildebrand said that since the meeting of the Survey Committee July 24 consideration has been given to methods of achieving a satisfactory surface in the interior of the Mark I tank. Three approaches to this problem have been considered, the first being the use of an appropriate type of paint over the sprayed aluminum coating to stabilize the present dusty surface. It has been the consensus of opinion that it would not be possible to establish the acceptability of any paint in the roughly 2-week period in which a decision should be reached. The second method considered has been overlaying the present aluminum surface with another metal applied by vacuum evaporation. After discussion with DPI this method has been abandoned on the basis that no significant improvement of the surface could be obtained. The third method considered has been mechanical treatment of the present surface to reduce its porosity and eliminate dusting. A large number of test samples have been prepared at Livermore using the same aluminum-spray technique that was used in the Mark I tank. The most satisfactory mechanical treatment thus far tried has been a wire brushing followed by rouge burnishing with a mechanical wheel. This produces a good-appearing surface which does not flake and which upon microscopic examination appears to be a firm metallic surface. The technique of brushing and burnishing, together with other types of mechanical surface treatment, will be tried on a large number of samples at Livermore and given a preliminary vacuum test in a vacuum bell jar. The most promising samples from these tests will then be brought to Berkeley for test by Nunan in his test cavity.

Avery said in case it is decided to remove the present aluminum surface some consideration has been given to substitute coatings to replace the aluminum and also to methods of moisture control to prevent rusting should it be decided to leave the steel tank bare. Various types of chemical treatment are being looked into to evaluate their feasibility.

Further consideration has been given to the suggestion, made by Lawrence at the July 24 meeting, to provide for separate pumping for

the region between the liner and the vessel so as to insure an outward flow of air during that period when the pressure is high enough to transport dust particles. The cost of a modification to the liner and pump manifold in effectuating this has been roughly estimated to be between \$50,000 and \$100,000. The work involved in making this change will to a large extent overlap the liner installation. It is therefore felt that the net time delay from this improvement will be only one to two weeks. It will be necessary to cover about half of the pumping slots to make this change.

Hanson said he felt it would be unwise to leave any portion of the tank bare since even if adequate control of rusting could be maintained by humidity control there still exists the possibility of a human or mechanical failure which could result in the rusting of the vessel after installation of the liner, at which time satisfactory cleanup would be extremely difficult and costly.

Lofgren asked for comments on the feasibility of producing an adherent black oxide coating the same or similar to the mill coating present on plates received from steel mills. It was the consensus of the meeting that excessively high temperatures would be required to produce such a coating and also that the adherent character of the mill coating may also be dependent upon the rolling of the steel at high temperature. Latimer said that GE has been successful recently in protecting copper surfaces with an adherent coating of copper oxide but is not aware of any work which may have been done with steel. Avery said they are hopeful that it will be possible to obtain a satisfactory phosphate coating on the steel if it becomes necessary to completely remove the present aluminum surface.

Hildebrand said the tank at Livermore is presently down to air to permit the repair of a number of leaks. The pressure in the tank has been down to about 2×10^{-6} millimeters (20 Å). The present leak into the cavity is between 230 and 400 micron liters per second, compared to a goal of 70 micron liters per second. Lofgren said the best vacuum obtained at the Radiation Laboratory in a large system was with the quarter-scale bevatron model in which a pressure of 1×10^{-6} millimeters (10 Å) was attained. He said the 184-inch cyclotron tank contains about a ton of graphite which has a marked tendency to adsorb gases. For this reason the cyclotron tank is a rather poor vacuum system and this machine normally operates with a pressure of about 10^{-5} millimeters (100 Å). In answer to a question from Derry, Lawrence said we want to achieve the best vacuum possible for Mark I but that we are presently at a pressure which is as good as we had originally hoped for.