Mallinckrodt NUCLEAR
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October 21, 1970

Mr. Jack R. Roeder, Chief
Materials Inspection & Enforcement Branch
Division of Compliance
U. S. Atomic Energy Commission
Washington, DC 20545

Dear Mr. Roeder:

REFERENCE: USAEC LICENSE #24-04206-01 & USAEC LICENSE #29-13564-01

The purpose of this letter is to inform you of the actions we have taken regarding certain filmbadge reports for the second quarter of 1970. The R. S. Landauer Jr. filmbadge service reported exposures to four individuals in excess of the limits in 10CFR-20 for this period. The reports pertained to the whole body exposures of two individuals working at our Carlstadt, New Jersey facility and to the extremities exposures of two individuals working at our Maryland Heights, Missouri facility. We questioned the interpretation of these films based upon exposure studies we had performed and requested that a re-evaluation of the exposures be made.

The initial request was made on June 26, 1970 at which time I personally visited Mr. Landauer to see if we could mutually resolve the considerable disagreement which existed between filmbadge and pocket chamber results. I informed him of the working conditions under which we had found that the reported filmbadge exposures would be approximately twice the actual exposures due to directionality effects. He stated that he was aware of this situation which resulted from his adoption of the procedures used by the NSF. (He previously had rotated his filmbadges when calibrating to take directionality effects into consideration.) I inquired as to the effect missing lead filters would have on the interpretation of exposures since we had discovered that a large number of our badges were indeed missing lead filters. We also had been informed by the RSO at Carlstadt that he had found the lead filters missing in the body badges worn by the two individuals with high reported exposures. Mr. Landauer stated that the error would be large for low energies.

I further informed him that we had begun additional exposure studies with experimental filmbadges to determine the extent of error due to directionality effects and missing lead filters as a function of gamma energies. (We subsequently found a factor of 2 error for directionality effects and a factor of 15 error for missing lead filters as maximum errors for 77 Kev gammas.) I stated that all our data would be made available to assist him in re-evaluating the four exposures in question. Mr. Landauer suggested that TLD's be added to a select number of our personnel body and wrist filmbadges to provide a third method of measuring the exposure and that the re-evaluations be made after a complete review of all data.

All available information was included in a letter sent to Mr. Landauer on July 16, 1970 at which time an additional request for re-evaluation was made.

A letter dated September 28, 1970 was received from Mr. Robert Wheeler, Technical Director at Landauer, in which Mr. Wheeler essentially stated his position that the filmbadge results in question were correct. This letter was followed by one dated October 7, 1970 which included the comparative filmbadge and TLD results for the first six weeks of the third quarter.

We are awaiting results for parallel exposure studies made with filmbadges provided by the Nuclear Chicago and Radiation Detection filmbadge services to determine their ability to compensate for directionality effects and their accuracy of reporting. We are also reviewing the two previously mentioned letters from the Landauer filmbadge service as well as our own assumptions, data, and conclusions to decide upon the best estimate of the exposure for these four individuals during the second quarter of 1970.

Upon completion of this review, we will inform you of our decision regarding the exposure which will be entered in the radiation history files for these individuals.

Sincerely yours,

MALLINCKRODT CHEMICAL WORKS
MALLINCKRODT/NUCLEAR

Donald W Soldan

Donald W. Soldan, Chief
Radiological Protection Officer

cc: Director, USAEC Region I
Director, USALC Region III