



DEPARTMENT OF THE ARMY

HARRY DIAMOND LABORATORIES

WASHINGTON, D.C. 20438

Mr. Grucci/jda/9126

12/11/67 MB

IN REPLY REFER TO:

AMXDO-RBB

29 June 1967

Mr. Nathan Bassin
Isotope Branch
Division of Materials Laboratory
United States Atomic Energy Commission
Washington, D. C. 20545

Dear Mr. Bassin:

In reply to DML:IB:NB (93820) dated 26 June 1967, the following information is forwarded:

a. The sources will be used for the calibration of scintillation detectors and thermoluminescent detectors.

b. All calibrations will be done in the exposure room in Blég. 122, which presently houses a Model FX 35 Flash X-Ray unit. The exposure room has the following concrete shielding thicknesses:

primary barrier--36"
secondaries--36" and 18"
wall of preparation room--24"
door area--25' from source--8"

During calibration no personnel will be in the exposure room. The sources will be grooved for the insertion of a rod. Initially, the rod will be inserted into the source by the following method: the source container will be placed on a cart with two rows of 3 inch lead blocks interposed between the individual and the source. Viewing of the source will be done by a mirror; the top of the source container will be opened, and a 2 foot tong will be used to insert the rod. A cord will be attached to the rod and the calibration source will be connected to a remote control unit in the preparation room. An automatic stop will insure that the source is at its desired height for calibration.

Estimated exposures for inserting the rod:

Total body: 2 curies of $\text{Co}^{60} \cong 30 \text{ r/hr}$ at 1 ft distance from source to lead blocks = 1 ft. transmission of Co^{60} in 6" lead = 2×10^{-4}
exposure time = 5 minutes = 1/12 hr, $30 \text{ r/hr} \times 2 \times 10^{-4} \times 1/12 \text{ hr} = 0.5 \text{ mr.}$

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Hand exposure:

$$\text{Co}^{60} = 12.8 \frac{\text{r-cm}}{\text{mc-hr}} \times 2 \times 10^3 \text{ mc} = 25.6 \times 10^3 \frac{\text{r-cm}}{\text{hr}}$$

hands \approx 60 cm away from source

$$25.6 \times 10^3 \frac{\text{r-cm}}{\text{hr}} \times \frac{1}{(60)^2} \times 1/12 \text{ hr} \approx 592 \text{ mr}$$

The exposure anticipated in the operation room is based on these considerations:

2 curies $\text{Co}^{60} \approx 30 \text{ r/hr}$ at 1 ft. Distance from source to wall of preparation room = 10 ft. Wall thickness of preparation room = 24" concrete. Transmission of Co^{60} in 24" concrete = 4×10^{-4} .

$$\frac{30 \text{ r/hr} \times 4 \times 10^{-4}}{10^2} = 0.12 \text{ mr/hr}$$

Personnel near the door area

$$\frac{30 \text{ r/hr} \times .17 \text{ transmission}}{(25)^2} = 8.1 \text{ mr/hr}$$

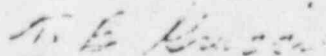
Since personnel in this area spend approximately two hours a week near the door area, the anticipated exposures are not expected to exceed 16 mr per week during intervals of calibration.

d. All personnel will wear film badges and finger rings (where necessary), and are instructed in the hazards of handling sources before being permitted to work with the sources.

e. After usage, the sources will be stored in wells in the Radioactive Materials Storage Bldg. 135.

f. Anticipated exposures from the one curie Cs^{137} source have not been included. The most energetic and largest source would be the guideline for radiation protection.

Sincerely yours,



A. B. GRUCCI

Radiation Protection Officer