

## RADIOACTIVE LUMINOUS COMPOUNDS

### DECONTAMINATION

#### INTRODUCTION

1. This instruction will detail the technique and equipment used to decontaminate and seal equipments that utilize radioactive luminous compounds.

#### HAZARD

2. It has been found that radioactive luminous painted equipments create a serious ingestion hazard from the 'dusting off' of paint in very minute particles.

3. The most common radioactive luminous compound in use contains radium 226. It is combined in proportion of 70 micrograms per gram of compound. The maximum permissible body burden of radium is 0.1 micrograms. There is no cure for radium poisoning. The only positive treatment is PREVENTION.

4. The basic measures necessary to control the hazard are:

- a. Monitor all known or suspected radioactive luminous items.
- b. Neutralize the source of contamination.
- c. Remove or dispose of all contaminate.

#### SAFETY REQUIREMENTS

5. The control measures as stated in para 4 are very simple. However, special techniques and tools have been developed to ensure that the following conditions are met:

a. Maximum health protection is afforded all personnel employed in the control of the hazard (Static Operations V400 refers).

b. Accidental contamination of buildings or areas, where decontamination work is carried out, is controlled by monitoring and strict adherence to the packaging detail found in Ordnance Manual Chapter 4-1010-16d.

#### PROCEDURE

##### DECONTAMINATION FACILITIES

6. Decontamination facilities will vary with the type and quantity of the workload.

7. Small equipments and components will be decontaminated and sealed in 4230-21-108-0265 Decontamination Outfit, Radioactive Luminous Compounds, per EIS 9185. (Instruments Y800, Y801 and Y802 refer).

8. The stripping of luminous paint, prior to refinishing, is performed in a large dry-box. This function is restricted to Base Workshops.

##### DETECTION EQUIPMENT

9. The minute size of most contaminating particles make them impossible to detect without special equipments, namely the beta-gamma contamination meter and the ultra-violet (UV) lamp.

Beta-Gamma Contamination Meter  
(Geiger Counter)

10. Radium emits a small amount of gamma radiation in addition to alpha particles. Other luminous compounds use beta emitters. A geiger counter may be used to detect this radiation. When used as an aid to luminous compound detection, the geiger counter has a limitation in that the radiation from very small particles of contamination is so minute that it can be easily missed when the exact location of the particle is not known. This instrument is however very effective in determining whether a particular luminous compound is radioactive.

Ultra-Violet (UV) Lamp

11. Luminous compounds may be activated by sources of energy other than radioactivity and visible light. One source which is relatively economical and portable is a UV lamp. A mercury-arc lamp generates a large quantity of ultra-violet in addition to visible light.

HQ 6980-1 TD 0239 (7168)

A very dense blue-black filter placed over the lamp will attenuate the visible light and pass the ultra-violet freely. The ultra-violet over-activates the compound causing it to glow brightly, so that small particles become visible. It has a disadvantage in that it must be used in a darkened area.

#### SAFETY REGULATIONS

12. To ensure maximum safety for personnel, and to restrict contamination to the decontamination area, the following regulations will be strictly adhered to:

a. Personnel will be provided with suitable protective clothing that will be worn at all times during decontamination work.

b. Personnel will not eat, drink, or smoke in the decontamination area. Cuts and abrasions will be completely protected from contamination.

c. All equipment will be monitored and decontaminated before removal from the decontamination area.

d. Heavy contaminate will be removed from floors, walls, and appliances when necessary. Work surfaces and tools will be completely decontaminated at the completion of each job.

e. Contaminated waste will be placed in the containers provided, as it is encountered. When the containers are full they will be sealed, monitored and removed from the area for disposal in accordance with Ordnance Manual Chapter 7-408-6.

f. Personnel will remove protective clothing and be monitored before leaving the decontamination area.

g. The floor immediately outside the decontamination area will be monitored regularly to ensure that contaminate is not being spread by traffic out of the area or by air currents.

#### AREA DECONTAMINATION

13. Areas where the repair of luminized equipment has been carried out without benefit of protective measures will be considered as

contaminated. Decontamination of such areas is technically similar to equipment decontamination, only the method of attack is different. Systematic planning by the Radiation Safety Officer cannot be over-emphasized as the particular situation will influence the methods employed.

14. If an area is suspected or known to be contaminated it must be surveyed, without moving the contents, to determine the degree and bounds of the contamination.

#### RESEALING

15. It is not sufficient to decontaminate an equipment; the source of contamination must be sealed to ensure that the equipment will not be recontaminated. To attain this condition, all luminized components will be inspected to determine the condition of the luminous compound. If only a small amount of the compound has flaked off and the remainder is properly bonded, the compound is still serviceable and after careful light brushing to remove any loose compound, it will be resealed. However, if the edges of the compound have lifted away from the metal, the component must be reluminized or disposed of as contaminated waste.

16. Resealing will be done as soon as possible after the components have been decontaminated. The sealing material will be clear acrylic resin. It is catalogued as 8030-21-579-4955, sealing compound, acrylic resin, 12 oz in spray dispenser.

17. The compound may be sprayed directly onto components that may be completely covered. However, if only a small area of the component is to be coated, the component will be masked before spraying or the compound may be applied with an eye dropper. Application by brushing is not recommended as the solvent in the compound will loosen the luminous paint and brushing will mix the particles with the compound.

#### CONTAMINATED PACKAGING MATERIALS

18. All materials used in the packaging of contaminated items will be regarded as contaminated. If it is economically possible, these materials must be decontaminated, even if the

materials are of no further use. Disposal of contaminated waste is costly and the volume must be held to a minimum.

### SUMMARY

19. Radioactive contamination from luminous compound is a new problem. These instruc-

tions, while based on the best advice available, may require amendment in the light of further experience. The most important aspect of this instruction is that all personnel concerned with the repair or handling of equipments employing this compound, be impressed with the necessity of confining the contaminate so that it cannot gain entrance to the human body.

END