SECTION 14

PERSONNEL DECONTAMINATION

14.1 The aim of personnel decontamination is cleanliness; all the precepts of good personal hygiene apply. Radioactive contamination gets on a person the same as ordinary "dirt", and the methods that apply to the removal of dirt from the skin apply also to the removal of radioactive contamination. A common misconception is that radioactive isotopes differ from isotopes of the same elements in chemical properties because they are radioactive. Nothing could be further from the truth. All isotopes of the same element are chemically identical.

14.2 The importance of removing the radioactive "dirt" stems directly from the fact that it is radioactive. It is continuously emitting radiation which may be absorbed by the body. If the level of contamination is high, the contaminant must be removed immediately to prevent radiation burns, total body irradiation, or internal deposition of the contaminant. Even low-level contamination presents a hazard if taken into the body.

14.3 As with equipment and terrain, the simplest procedures for decontamination should be utilized first. The first step in effective personnel decontamination is a thorough monitoring of the entire body. Procedures when monitoring are:

* Monitor both hands and forearms with palms up; repeat with hands and arms turned over.

* Monitor the entire front of the body, starting at the top of the head. The forehead, nose, mouth, neckline, torso, knees, and ankles should be thoroughly checked. Repeat the procedures for the back.

* Monitor the soles of the feet.

14.4 Next, "hot spots" on the body should be spot cleaned to prevent the spread of this contamination to the rest of the body. Washing with soap and water, using cotton swabs or gauze, is a good procedure for spot cleaning. Masking tape is effective in removal of dry contaminations. In stubborn cases, several preparations for skin cleansing have been tried and proved effective. The examples below give several preparations which may be used:

14.4.1 Aqueous

A) A mixture of 50% Tide and 50% cornmeal made into a paste with water. Scrub, using additional water.

B) Mildly abrasive soap (Lava).

C) A 5-percent water solution of a mixture of 30% Tide, 65% Calgon, and 5% Carbose (carboxymethylcellulose) used with added water.

14.4.2 Waterless

A) Mechanic's waterless hand-cleansing cream.

B) A homogeneous cream of 8% Carbose, 3% Tide, 1% Versene, and 88% water.

14.5 The final step in decontamination is showering. Large amounts of soap and water should be used. Special attention should be given to the hair, hands, and fingernails. In most cases all the contamination will be removed by use of the above methods.

14.6 If contamination persists, repeat the operations until it is obvious that these methods are ineffective. The following procedures should be used with caution and are presented for the sake of thoroughness and to outline steps to be taken if extremely stubborn contamination is encountered. They are primarily meant as procedures for hand decontamination but can be applied to other parts of the body.

14.7 If physical methods for decontamination fail, chemical methods might be necessary. Two such methods are:

* Apply ammonium citrate or citric acid, rub for approximately 5 minutes, wash with water, dry, and monitor. Citrates form water-soluble complexes with many contaminates. With some contaminates, it might be more efficient to soak the contaminated area in a basin of warm water containing one-half gram each of tartaric and citric acids.

* If the contaminating isotope is known, it is possible to reduce the contamination level by treating the affected area with a stable isotope of the same element. Rinse or soak in a solution containing a

stable isotope of the contaminant. This reduces the concentration of the radioactive atoms through an exchange process with the stable atoms. Monitor after drying.

14.8 If the foregoing methods fail and the contamination level is still dangerously high after two or three trials, an attempt can be made to remove the outer layers of skin on which the contamination has been deposited. This method should be used only with a doctor's consent and under his supervision! The procedure involves rubbing the contaminated area with a swab soaked with a 4-percent solution of potassium permanganate and then removing the stain with a 4-percent solution of sodium bisulfate.

14.9 The removal of contamination from a person should be as complete as practicable. However, it should be realized that the removal of the last few radioactive atoms does not justify injury to the skin. The biological significance of a small amount of contamination must be compared with the damage produced when vigorous decontamination techniques are employed. When in doubt, always consult a competent authority before proceeding with any decontamination technique that may injure the body tissues.

14.10 Bioassay will be performed on personnel who have a potential of receiving an internal dose 10 percent of the limits set forth in Table 1 of Appendix B to 10 CFR 20.1001-20.2401.