



UNITED STATES MARINE CORPS
HEADQUARTERS AND SERVICE BATTALION
MARINE CORPS BASE
2006 HAWKINS AVENUE
QUANTICO, VIRGINIA 22134

IN REPLY REFER TO
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From: Radiation Safety Manager/Officer, Headquarters and Service Battalion
To: Distribution List

Subj: UNIT TRITIUM DEVICES STANDARD OPERATING PROCEDURES (SOP)

Ref: (a) MCO 5104.3B
(b) MCBO P5100.1D, Chap. 17

1. Purpose and Scope. This SOP establishes procedures for Headquarters and Service Battalion for handling, storing, disposing, and emergency response of Tritium containing devices. Strict adherence to these procedures ensures personnel exposure to ionizing radiation is maintained "As Low As Reasonably Achievable" (ALARA).

a. Tritium: Tritium is a radioactive isotope that emits low energy beta particles. Tritium is the heaviest isotope of the element hydrogen and it is widely used in both civilian and military applications. In military applications, such as dials, compasses, fire control devices, and aiming sights, the tritium is contained in a Pyrex glass tube that has been lined with phosphor. The interaction between the phosphor and the beta particles emitted by the tritium gas produces visible light.

b. Hazards of Tritium. The low beta energy of tritium cannot penetrate the intact Pyrex tube; however, if the tube is broken, the tritium gas dissipate and outer surface of the device and surfaces in the vicinity of the break may become contaminated. Because of its weak beta radiation, tritium is not readily measured by traditional field instruments, wipe testing to determine any level of contamination. The hazard nature of tritium is due to its ability to combine with other materials. Tritium water vapor is readily absorbed by the body, both through inhalation and skin absorption. In addition, tritium that has plated out on a surface or combined chemically with solid materials presents a contact hazard.

2. Storage, Labeling, Emergency Action and Disposal

a. Storage

(1) Tritium devices shall be stored in secure areas to prevent unauthorized removal or access.

(2) When not in storage, control and constant surveillance of tritium devices will be maintained at all times.

(3) Tritium devices shall not be stored in office spaces, food storage areas or berthing areas.

(4) Tritium devices shall not be stored in the same room or warehouse section with explosives or flammable materials.

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(5) Storage areas will be free from flooding and adverse weather conditions.

(6) Storage areas for tritium devices will be well ventilated.

b. Labeling Requirements

(1) All tritium devices shall be labeled as radioactive.

(2) All storage areas containing tritium devices shall also be labeled as radioactive.

(3) The label shall be clearly visible and bear the three-bladed radiation symbol and the words "CAUTION, RADIOACTIVE MATERIAL" or "DANGER, RADIOACTIVE MATERIAL." The standard radiation symbol will use the colors magenta, purple, or black on a yellow background, unless otherwise authorized.

(4) If the labels are missing or illegible, these must be replaced in a timely manner.

c. Emergency Action. In the event of an emergency involving a tritium device, actions to save life, aid the injured, fight fires, or control further spread of damage, takes precedence over concerns for radiological contamination. To minimize personnel exposure from possible internal contamination, take the following steps:

(1) Sound the alarm. Vacate the immediate area and remain upwind for at least 30 minutes or until directed by the unit RPA to re-enter. If in the building, open doors and windows or operate fans to increase ventilation.

(2) As soon as possible, notify your unit Safety Officer, RPA and the Installation RSM.

(3) In case of fire, stay away from the downwind smoke. Move upwind a minimum of 100 meters or further as directed by emergency response personnel.

(4) To maintain control of contamination, devices with broken sources and any resulting debris should only be handled while wearing Personal Protective Equipment (PPE: Latex or Nitrile gloves).

(5) Devices with broken sources and any resulting debris should be double bagged in plastic and sealed with tape. Clearly label the outside of the package "BROKEN TRITIUM DEVICE-DO NOT OPEN"; if available, include specific device information such as National Stock and/or Part Numbers. The broken devices will then be disposed of via the Low Level Radioactive Waste (LLRW) program managed by the IRSM.

(6) Personnel who may have handled the broken device shall wash, as soon as possible, with a non-abrasive soap and warm water.

(7) Contaminated clothing should be removed and double bagged in plastic and sealed with tape indicating the type of device handled and the date of the exposure.

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(8) Swipe tests will be performed after cleanup efforts are made to verify decontamination efforts have been successful in removing as much of the radioactive material as possible. The location of the spill/accident needs to be physically blocked off and/or covered with plastic to avoid spreading the contamination until directed by the IRSM to remove the barrier only after the results of the swipe test have returned from RADCOM and there is no contamination present.

d. Disposal of Tritium Devices. The following guidelines are provided for properly disposing of broken, unserviceable, unwanted or surplus tritium devices.

(1) Under no circumstance will any tritium device be disposed of in the trash or through DRMO. All tritium devices will be disposed of through the Navy LLRW Disposal Program managed by NAVSEADDET RASO via the IRSM.

(2) Broken Devices. The handling of broken devices will be adhered to per the emergency action section of this SOP (section c).

(3) Surplus Radioactive Commodities. Surplus tritium devices, also referred to as Unwanted Radioactive Materials (URM), although serviceable, will not be transferred to DRMO but will be retained until disposition instructions are received from the inventory control point. Make all efforts to locate a unit that may be able to use the item. If all resources have been exhausted to find new users for the item, it can be disposed of as LLRW via the IRSM. Prepare a DD Form 1348, Issue Release/Receipt Document, per local instructions for each item or NSN to be turned in. The following instructions pertain to creating a DD Form 1348:

(a) In data block 4, the "MARK FOR" block annotate "LLRW" or in data block 27, the "ADDITIONAL DATA" block, annotate "Mark For: Low Level Radioactive Waste."

(b) In data block 3. "SHIP TO" block, annotate "M30002, Base Safety, IRSM."

(c) In data block 27, the "ADDITIONAL DATA" block, annotate the name of Responsible Officer (RO) authorizing the transfer of the compasses with a signature, phone number and date.

(4) Lensatic Compasses. Compasses containing Tritium that are determined unserviceable will be disposed of as LLRW via the IRSM. Unserviceable compasses will be transferred LLRW storage site managed by the IRSM. Procedures for disposing of applicable compasses are as follows:

(a) Determine if the compass is unserviceable per applicable technical instructions, supply instructions, equipment manuals, or naval messages.

(b) Unserviceable compasses include:

(1) Damaged or defective compasses containing tritium, NSN: 6605-01-196-6971.

(2) Compasses no longer authorized for use, NSN: 6605-00-846-7618.

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(3) Compasses that exceed the 12-year shelf life from the date stamped in ink inside the compass cover.

(c) Once you have determined that the compass is unserviceable and deemed as LLRW, complete the following:

(1) Remove the lanyards and pouch from each compass.

(2) Prepare a DD Form 1348, and follow the same instructions as section (3).

(3) Contact the LLRW Site Manager located in the Base Safety Office to schedule an appointment for turn in.

(4) Any compasses suspected of being damaged shall be double bagged in plastic and marked per the guidance in paragraph 2 of this section.

(5) When turning in radioactive material to the IRSM, ensure to provide a DD Form 1348 and USM Radioactive Material Movement (RMA) Form. The owning unit will maintain all turn-in documents for a minimum of three years.

3. Inspections. Tritium storage area shall be inspected by the RPA at least quarterly in order to ensure the safety of personnel and compliance with established radiation safety standards.

4. Training

a. RPAs shall attend training provided by the IRSM as soon as appointed or within three months of assignment as RPA.

b. Other personnel working in the areas where tritium devices are stored shall attend annual radiation awareness training provided by the IRSM.

c. Coordinate training with the IRSM located at MCBQ Safety Division.

5. The point of contact concerning this SOP is Captain Maxwell A. Chmelik at maxwell.chmelik@usmc.mil or (703) 784-6696.



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