



DEPARTMENT OF THE NAVY  
NAVAL ELECTRONIC SYSTEMS COMMAND  
WASHINGTON, D.C. 20360

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NAVELEX INST 5100.1  
ELEX 0516  
1 July 1968

NAVELEX INSTRUCTION 5100.1

From: Commander, Naval Electronic Systems Command  
To: ALL SHIPS AND STATIONS

Subj: Radioluminescent Materials; Hazards of

Ref: (a) NAVELEX INST 5100.2 (NOTAL)

1. Purpose. The purpose of this Instruction is to reemphasize the need for awareness of the hazards associated with radioluminescent material and to provide information pertinent to the handling of this material.
2. Cancellation. BUSHIPS INSTRUCTION 5100.15 of 5 September 1962 (NOTAL) is hereby cancelled.
3. Scope. This Instruction applies to all radioluminescent material whether government property or privately owned.
4. Definition. Radioluminescent Material - Any material which luminesces (emits light) while being bombarded by Nuclear Radiation if, and only if, the source of Nuclear Radiation (radioactive material) is contained within the device.
5. Background. Clocks, compasses, depth-gauges, wrist watches and other items containing radioluminescent material constitute a potential health hazard. Direct radiation from this material is of little consequence; however, radioactive particles from this material may constitute a serious internal radiation hazard if taken into the body. Another potential hazard is the inhalation of radon daughter products if some radioactive luminescent material is displaced in an enclosed atmosphere. For example, experience on submarines has indicated that a watch with luminescent (i.e., radium) dial and hands with an unbroken crystal can produce airborne particulate radioactivity levels greater than the permissible limit. This particulate radioactivity is the result of radon-222 decay and this level of radon gas approaches the limit for continuous exposure which would result in personnel radiation exposure greater than 0.5 rem/year. Damaged or deteriorated radioluminescent material or devices containing this material may contaminate local

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areas with radioactive particles which can then circulate in the air or be picked up on the hands and clothing of personnel. Also, whenever airborne radioactive particles are present, ventilation filters and electrostatic precipitators will collect and concentrate these particles and may become a radiological hazard. These conditions can lead to the ingestion or inhalation of radioactive particles. This hazard is frequently ignored because the physiological effects of unsafe exposure to small amounts of radioactivity are not immediately apparent; they may take months or years to appear and may never be traced to the initial cause.

6. Action. In order to guard against the hazards of radioluminescent material, addressees shall:

a. Take appropriate action to inform all hands of the hazards associated with radioluminescent materials. Breakage of a device containing such material, or even unobservable leakage of the material out of the device, can create a potential health hazard should the material get into the body either orally or through open cuts or scratches. A person's life-time body burden can be acquired with extremely small quantities of some radioluminescent materials.

b. Make visual inspections and conduct monitoring to detect the presence of radioluminescent materials. Monitoring should include periodic checks of areas where the work might involve the handling of components bearing this material. Any material exhibiting a radiation level of more than one tenth of one milliroentgen per hour (mr/hr) above background at a distance of approximately one inch from the material should be treated as radioactive. Radiac Set AN/PDR-27 (series), or an instrument of equivalent sensitivity, with the detector end window open is a suitable radiacmeter for detecting this radioactivity.

c. Remove all radioluminescent devices, including repair parts, which are not operationally essential.

d. Insure that modification or repair of radioluminescent materials be performed only by organizations qualified for such work, in accordance with reference (a). A statement by the repair facility that it is so qualified will be sufficient evidence thereof.

e. Do not handle components bearing radioluminescent material any more than necessary. When handling is necessary, wear gloves to prevent contamination of the hands. Refrain from smoking or eating while handling radioactive material. Keep radioactive material away from personal property and foodstuffs.

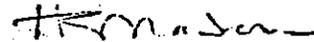
f. Exercise special care in handling any equipment on which the radioluminescent material is flaking or dusting. When this condition is observed, isolate or cover the item until it can be removed.

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g. Prohibit handling of broken or damaged items containing radio-luminescent material except by individuals wearing rubber gloves. Broken or damaged items should be placed in leak proof containers, marked as radioactive, and transferred to the nearest naval supply activity for ultimate disposal in accordance with NAVSUP INSTRUCTION 4510.27 of 3 January 1968.

h. Clean all areas suspected of being contaminated so as to prevent inhalation or ingestion of the material or the spread of contamination. All radioactive material removed, including contaminated liquid waste and solid waste such as rags used in cleaning, should be collected and promptly sealed in leak proof containers, marked as radioactive, and transferred to the nearest Radiac Repair Facility for ultimate disposal. Cleaning operations shall be so conducted as to minimize contaminated waste.

i. Contaminated ventilation filters should be disposed of as in 6 h. above. Washdown of contaminated electrostatic precipitators should be followed by liberal flushing of any affected areas to remove residual contamination.



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