
GENERAL SAFETY RULES

SECTION NO. 9

SAFE HANDLING OF RADIOACTIVE

LUMINOUS COMPOUND

January, 1942.

(A)

I. INTRODUCTION

1. The precautions contained in this order largely embody substances from the National Bureau of Standards Handbook H27 "Safe Handling of Radioactive Luminous Compound", issued by the U. S. Department of Commerce, and shall be rigidly adhered to in order to protect all personnel engaged in the operation and servicing of naval equipment against injury due to radium poisoning.

II. GENERAL CONSIDERATIONS

1. **RADIOACTIVE LUMINOUS COMPOUND.**--The material known as radioactive luminous compound or "luminous material" or "radium paint" is a mixture of phosphorescent zinc sulfide and radium, mesothorium, or other similar radioactive substance. It is usually packed in small glass bottles holding 1 gram of the compound. It is used to make markings that are visible in total darkness by virtue of the light emitted by the zinc sulfide under bombardment from the radium. This compound is mixed with an adhesive to form a "paint" just before its actual application.

2. **HAZARDS IN HANDLING RADIOACTIVE LUMINOUS COMPOUND.**--It is well known that serious injury and even death may result from injudicious handling of this compound. The known hazards may be classified in the order of their importance as follows:

(a) Ingestion or inhalation of solid radioactive luminous compound.--The most serious injuries in the past have resulted when the compound was taken directly into the body through the mouth or by inhalation. Experience during the last 15 years has shown that when due precautions are taken to prevent the compound entering the mouth or lungs of the worker no detectable injury has resulted.

This can be understood when it is borne in mind that the radium in the compound is responsible for the injuries produced by the ingestion or inhalation of the compound and that the maximum destructive effects are produced after the radioactive material has been deposited in the bones. Therefore, the radium must first find its way into the blood stream, which can only occur in appreciable quantity through the mouth and lungs. A small fraction of each amount of radium taken into the body is deposited in cumulative amounts in the bones. In this way, over a period of years, a dangerous amount of radium may be accumulated in the skeleton as the result of a small daily absorption.

Even after a dangerous amount of radium has been accumulated in the skeleton, the effects are slow in becoming evident. It is now known that when deposits of radium are large the damage is chiefly to the skeleton, followed by damage to the white and red blood corpuscles, resulting in a leucopenia or

anemia or both. This has happened with deposits of from 12 to 100 micrograms of radium. Such large deposits should never occur if the instructions of this handbook are followed. An unfortunate feature of this situation is that the radium which has once been deposited in the bones remains there almost indefinitely and cannot be removed readily by medical treatment. Consequently, once this condition has been established there is little chance of restoring a normal condition in time to prevent serious effects. When small amounts of radium are deposited in the bones over a long period of time the chief effect is on the bone-forming cells, producing destructive and crippling bone conditions which may progress and become malignant, resulting in bone sarcoma.

It is therefore essential to avoid all ingestion or inhalation of radioactive luminous compound and to test workers periodically for exhaled radon in the breath. By this test, small deposits of radium can be detected long before clinical symptoms have appeared.

It is desired that any worker who shows a deposit of more than 0.1 microgram of radium, as revealed by the expired air test, change his occupation immediately and be treated by decalcification therapy, or any other modality which may have been developed for the purpose.

(b) Inhalation of radon liberated from compound into the air.-- The continued inhalation of radon or thoron may produce carcinoma of the lungs and may also be a contributing factor in the anemia resulting from radium poisoning. The radon concentration in the atmosphere of workrooms shall not exceed 10^{-10} curie per liter, according to present knowledge.

(c) Exposure of whole body to gamma radiation from compound.-- The whole-body exposure of the worker to gamma radiation shall not exceed 0.1 roentgen per working day. This general exposure to gamma radiation has been found to be safe, as far as any bodily injury is concerned.

In connection with the three types of hazards enumerated above, it is important to bear in mind that the tolerances have been determined under conditions where only one hazard was present. In the dial-painting industry all three hazards exist together, and this may reduce the tolerance on each. Insufficient information is available at present to determine to what extent this may occur. It is therefore important to keep well below the tolerances stated, to insure safety.

3. PRINCIPLES UNDERLYING PROTECTIVE MEASURES.--From the foregoing discussion of the general nature of radium poisoning resulting from the improper handling of radioactive luminous compound, it is clear that the fundamental purpose of protective measures is to prevent the ingestion or inhalation of the compound during its manipulation. However, this

seemingly simple requirement must be rigidly and continuously adhered to by all workers. Furthermore, working conditions must be arranged to provide a generally safe environment for the workers and to encourage their cooperation in carrying out rules intended to preclude any known possibility of injury. It is now known that this end may be achieved without reducing the output of the worker or interfering seriously with a normal working procedure. The situation may be summed up by stating that in the main the essential requirement is neat and orderly "housekeeping" which, under proper supervision, results in better working conditions, increased productivity, and safety for the individual worker.

All workrooms or places usually inhabited by workers shall be equipped with such ventilation as will reduce the radon content to a concentration not exceeding 10^{-10} curie per liter. Cleanliness with respect to the use of the compound will also help in removing possible sources of radon. Special attention shall be given to means for preventing the spilling of compound, especially in the dry form. If accidental spilling does occur, all traces of spilled compounds shall be cleaned up immediately with wiping papers which shall be disposed in the covered containers provided with paper bag liners.

The gamma-ray exposure can be controlled by permitting only small amounts of compound, either before or after application, to be present in the workrooms and by storing the compound in a lead-lined cabinet of a minimum thickness of one-half inch at as great a distance from the workers as possible.

So far as possible where radioactive luminous compound is applied it shall have a permanent protective cover of glass. If this is impracticable, such as in the case of engraved radio dial markings, depressed dot markings on radio knobs and switches, the material shall be painted over with shellac or covered with a colorless plastic. Applications of this kind which are not protected by a glass cover shall be confined strictly to those which are essential to the safe operation of the naval craft or equipment. The protective coatings, whether glass or paint, shall be maintained intact at all times in order properly to protect personnel engaged in the operation as well as servicing of the equipment.

The application of radioactive luminous compound is restricted to the establishments specifically authorized by the Navy Department to do this work.

4. HAZARDS IN HANDLING LARGE STOCKS OF RADIOACTIVE LUMINOUS COMPOUND.-- Whenever luminous compound is manufactured or stored in large quantities there is a possibility of general exposure to gamma radiation in excess of the tolerance dose. Special precautions shall be employed to protect workers engaged in this work.

III. PERSONNEL

1. SELECTION AND INSTRUCTION OF PERSONNEL.--The handling and application of radioactive luminous compound requires great care and special training to secure satisfactory results. For this reason alone, personnel must be selected with care. From the point of view of reducing hazards, it is also important that only workers who are naturally neat and careful should be employed. Continued carelessness or untidiness in handling material during the preliminary training period shall be reason for non-employment in these operations. A rigid physical examination shall be made of all prospective workers. No applicant who is not in good health or who has shown a history of such diseases as anemia or

tuberculosis shall be considered suitable for this work. Only persons with 20/20 visual acuity, either with or without glasses, and the ability to read Jager No. 2 print, with or without glasses, shall be employed in the application of radioactive luminous compound. No person under 18 years of age shall be employed in any room in which radioactive luminous compound is used or handled.

Before any person hereafter employed is permitted to use or handle radioactive luminous compound, such person shall be given preliminary training and instruction which shall include practice in the handling and use of substances, the use of tools, the use and care of protective clothing and equipment, and the application of rules for personal hygiene. Preliminary practice shall be with substances that do not contain radioactive ingredients. He shall be informed in detail of all known dangers involved. He shall be instructed regarding rules and regulations which have been set up for his protection and he shall be directed to observe them in all details. It is desired that those engaged in handling radioactive luminous compound familiarize themselves with the instructions of this handbook.

The personnel employed in the application of radioactive luminous compound shall be not in excess of the number authorized by the Navy Department for the establishment concerned.

2. EFFECTS OF RADIUM POISONING.--Since radium taken into the human body is partly retained and stored mainly in the bones the effects are chiefly injury to the bones. Characteristic results of radium poisoning are bone necrosis and osteogenic sarcoma. Accompanying these effects is a general lowering of vitality, so that resistance to ordinary diseases is lower. All of these conditions appear only after dangerous amounts of radium have been stored in the bones over a period of years. Therefore, there are no definite clinical symptoms which can be relied upon to guard against possible injury.

3. PHYSICAL EXAMINATIONS.

(a) A thorough medical and dental examination shall be made of each individual before employment and at least twice each year thereafter. The individual shall also be examined upon termination of employment.

(b) An examination for evidence of radioactivity shall be given each applicant and form a part of the periodic physical examinations as indicated above. This radioactive test shall consist in, or include, a measurement of the radon content of the expired air taken 12 hours or more after working with radioactive luminous compound. No one shall be engaged as a dial painter who shows more than 0.1 microgram of deposited radium, as revealed by the expired air test. This corresponds to 1 micro-microcurie of radon per liter of expired air. If after employment, an operator shows this amount of radon per liter of exhaled air, a complete investigation shall be made at once to determine the cause. It requires several hours for the radon inhaled in the workroom to become dissipated. If radon is present in the breath after the worker has been away from the workroom for at least 12 hours, it is most likely due to radium deposited in the body. If investigation reveals that the concentration of radon in the exhaled air is equal to or greater than the amount stated above and is found to arise from radium deposited in the body, the operator shall change his occupation at once.

(c) Blood Counts.--It is important that a complete blood count be made by a qualified laboratory technician before any individual begins work involving the handling of radioactive luminous compound. No one shall be employed in this

work who shows pertinent abnormalities in the blood count. The first blood count is valuable to the Medical Officer as a reference index for subsequent blood counts.

Although blood counts cannot be relied upon to indicate the initial stages of radium poisoning, they shall be made a part of the regular physical examination of all workers. More attention must be given to the trend of successive counts on the same individual than to absolute values. For proper interpretation, all counts should be made by the same laboratory technician and under the same conditions. Any pertinent abnormality, particularly leucopenia, relative lymphocytosis, or beginning anemia, which is persistent or increasing should be reason for careful investigation and possible change of occupation of the individual concerned.

4. PERSONAL CLEANLINESS.--Radioactive luminous compound must be treated as any other poisonous substance. Therefore, the worker must develop habits of extreme personal cleanliness in the workroom. The compound must not be spilled or scattered, and it must not come in contact with the hands or clothing to any appreciable extent. At the end of the working period, the hands shall be carefully washed with the solvent for the particular adhesive used. This shall be done in such a way as to remove all traces of compound. When mixed with adhesive the compound is not readily removed by soap and water. No edibles of any kind, including chewing gum, candy, or beverages, shall be brought into the workroom, nor shall they be touched before removing all traces of compound from the hands. A convenient method of inspection to determine whether the hands and clothing are free of compound consists in viewing them in a darkroom by means of a suitable ultraviolet lamp. The worker shall perform this inspection regularly under supervision, whenever leaving the workroom, and shall remove all radioactive substance by means of solvent and tissue. Adequate precautions shall be taken against exposure to excessive intensity of ultraviolet light. The "Argon Glow Lamp" or its equivalent, which may be readily procured from commercial sources in the 2½ watt, 105-125 volt, S-14, bulb size with medium screw base, is a convenient source of ultraviolet light for portable equipment, since it will operate on 60 cycle a.c. current without transformer or other special equipment.

5. NEATNESS IN THE WORKROOM.--The skill required for application of luminous compound demands neat and orderly methods of procedure. Therefore a skillful worker shall be expected to keep all utensils and equipment in a neat and clean condition at all times. Compound shall not be permitted to accumulate, and all utensils shall be left clean at the end of each working period.

6. TIPPING OF BRUSHES.--In some cases very fine markings are coated with radioactive paint, requiring a fine tip on the brush. This should be achieved by the selection of a proper size and shape of brush and by manipulation of the brush in the container for the mixed paint. At no time shall the brush be pointed by the lips or fingers. It is essential that the adhesives contain solvents or a substance which are distasteful to prevent the habit of pointing brushes between the lips. Experience has shown that the latter practice has been largely responsible for many of the fatalities which have occurred in the past.

7. SUPERVISION OF PERSONNEL.--Dial painters and others engaged in handling luminous compound shall be under constant and competent supervision to make sure that all recommended practices are strictly followed. It shall be the supervisor's duty to inspect utensils and equipment for neatness and cleanliness, and to examine the worker's hands at the end of working periods and after washing. This should be done under an ultraviolet lamp to see that all compound has been removed.

Rules regarding bringing food, candy, chewing gum, or beverages into the workroom shall be strictly enforced. The Medical Officer shall inspect, daily, rest rooms and lunchrooms (if available on the premises) to make certain that cleanliness is maintained and that no articles contaminated with radioactive luminous compound find their way into these rooms.

IV. WORKROOMS AND EQUIPMENT

1. GENERAL WORKING CONDITIONS.--The application and handling of radioactive luminous compound require workrooms physically separated from other working areas and equipment specially designed for the purpose. No work shall be undertaken in these rooms other than that strictly concerned with the application of the radioactive luminous compound. There shall be ample space (at least 12 square feet and 250 cubic feet of air space) for each worker. Overcrowding may readily lead to unsafe conditions. Natural daylight shall be used to the fullest extent for illumination and supplemented by artificial light when necessary.
2. FLOORS.--The floors shall have smooth, continuous surfaces, insofar as possible, and shall be of or shall have a surface of water repellant material, such as painted concrete or linoleum. Wood floors, with inevitable cracks, are prohibited. Only in this way can radioactive luminous compound which has been accidentally spilled be prevented from accumulating in the floors to an extent where it may present a hazard. Floors shall be cleaned daily by wet mopping to remove dust without distributing it over the room. No dry sweeping shall be permitted in rooms where radioactive luminous compound is handled.
3. WALLS, CEILING, AND WOODWORK.--Walls, ceiling, and woodwork should be well painted with a semigloss paint which may be washed occasionally to remove accumulation of dust.
4. ILLUMINATION.--Artificial illumination shall be used to supplement natural daylight in order to provide a minimum of 50 foot candles of diffused light on the working plane.
5. VENTILATION.--General forced ventilation shall be provided for all workrooms and dark rooms, so that the radon content of the air does not exceed 10^{-10} curie per liter at any place at any time. The weighing, compounding, and bottling of luminous compound shall always be done under appropriately designed hoods with suction ventilation to the outside air. Operators exposed to dust from radioactive luminous compound engaged in weighing, compounding, and bottling of luminous compound shall wear respirators of the "supplied-air" type, Navy Half Mask Type A (BuShips Specification INT 37M3)(Stock Number 37M310). All ventilating fans shall be arranged so that they may be speeded up to three times their normal revolutions per minute for 20 minutes before and after each working period to remove dust and radon which may have accumulated in the ducts and in the air of workrooms. Care must be exercised in providing sufficient air intakes so that the room ventilating fan will not create a back pressure on the painting hood suction fan.
6. DARK ROOMS.--Ventilated dark rooms for inspecting finished work shall be kept clean and free from scattered radioactive luminous compound. Painted objects shall be inspected in small lots. A monthly inspection with an ultraviolet lamp shall be made for the presence of possible accumulation of compound. Ventilation of dark rooms shall meet the requirements specified in preceding paragraph.

7. CONTAINERS FOR MIXED PAINT.--Suitable containers shall be provided for mixing the radioactive luminous compound with the adhesive. They shall be of convenient form and have a capacity just large enough so that the contents of a 1-gram bottle of compound can be mixed without danger of spilling the compound. These containers shall have a broad base in order that they may not be easily upset, and they shall be heavy enough so that the compound and adhesive can be mixed without holding the container by hand. The form of the container shall provide convenient means for pointing the brush and removing excess paint before removing the brush from the container. The inner surface shall be smooth, glazed, and have no sharp corners, to allow ready cleaning. All containers of radioactive luminous compound shall be covered at all times, whether full or empty, except while in actual use.

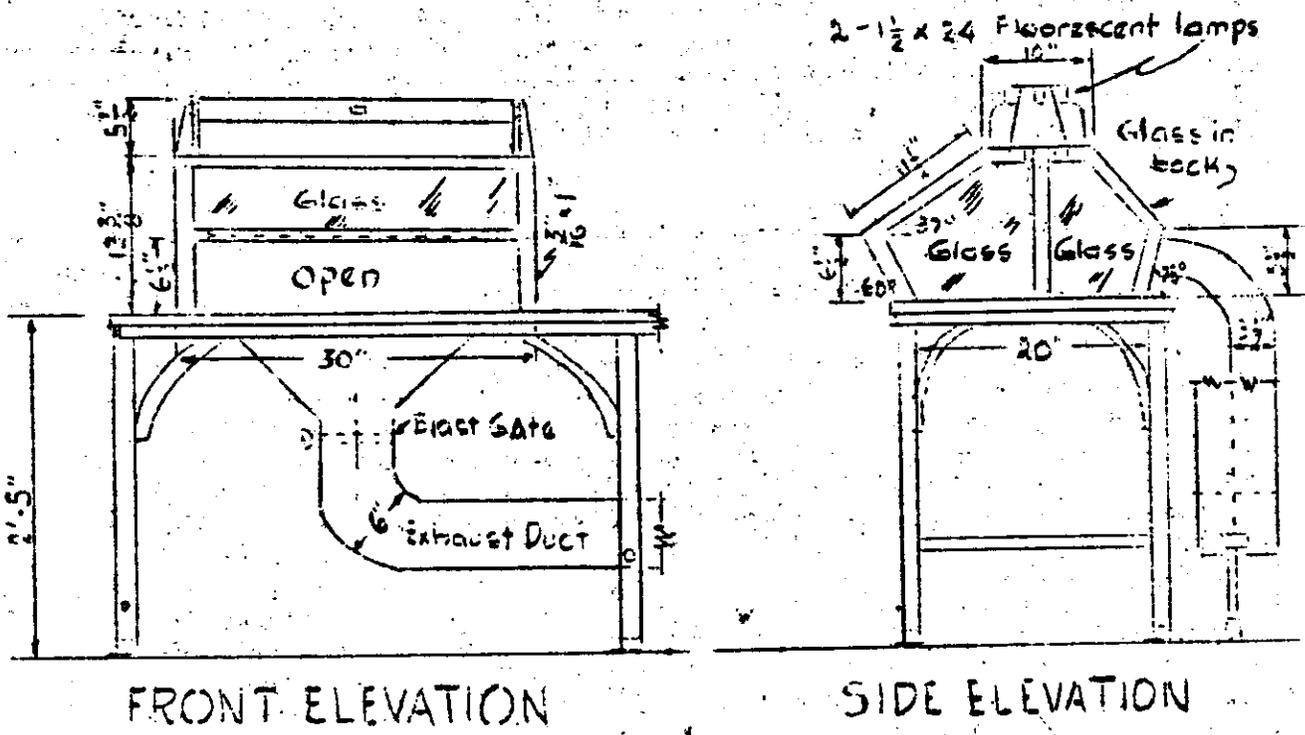
8. METHOD OF APPLICATION.--Best results are obtained when brushes of suitable shape and size are used for applying the luminous paint. Any dry method of application, such as dusting luminous powder on applied adhesive, is prohibited.

9. BRUSHES, STYLUSES, AND STIRRING RODS.--A convenient rack shall be provided for brushes, styluses, stirring rods and other implements not in use so that they will not be placed on the table top, causing the bristle portion of the brush, tip of the styluses, etc. to come in contact with anything about the work table. Solvents in a suitable container and small wiping papers for cleaning these implements shall be provided. These wiping papers shall be used only once and shall then be placed in covered containers provided with a paper bag liner. The containers for discarded wipers shall be removed at least once each day. The contents permanently disposed of, outside the workrooms, by burning or returning to the manufacturer of radioactive luminous compound for reclaiming the radium. Under no circumstances are the hands to be brought into contact with the waste being disposed. A suitable notice to this effect should be placed directly on the waste can for the information of the individuals removing the waste for disposal. Cloth is not suitable for wiping and pointing brushes and shall not be used.

10. TABLES.--The tables used for dial painting, weighing, and other manipulations of radioactive luminous compound shall have a glazed porcelain surface or other smooth, continuous surface impervious to moisture and solvents used with the adhesive. There shall be no cracks, crevices, or sharp corners in which compound may accumulate. If provided with drawers, no radioactive luminous compound shall be stored in these drawers, and no edibles of any kind placed in them. The drawers should be small to permit easy inspection, which should be made each week.

11. HOODS.--Each work table shall be provided with individual mechanical exhaust ventilation. This removes radon and dust from radioactive luminous compound at the source and also serves to increase the general ventilation of the workroom. This local ventilation at the work table should be similar in design to the sketch shown in figure No. 1. The design of such hood installations should be such as to provide an air movement of not less than 100 linear feet per minute at the face of the opening of the hood. The installation of such arrangements as described does not in itself insure safety. This air movement may require modification so that the concentration of radon in the air of the workroom does not exceed 10^{-10} curie per liter at any place at any time.

12. DIAL PAINTER'S EQUIPMENT.--On each individual painting table there shall be provided a porcelain or glass crucible and suitable holder for mixing compound with adhesive; a glass mixing rod; a glass bottle or crucible of solvent for washing brushes and wiping any spilled particles of compound; wiping papers; the necessary brushes and suitable racks for holding them when not in use; and any other tools or devices designed specifically to facilitate the work. No



NOTE: Glass shall be of 1/4" plate glass, commercial grade.

Recommended Operation: Provide a minimum air movement of 100 linear feet per minute at the face of the hood opening.

RADIUM DIAL PAINTING HOOD
Recommended Design

Figure No. 1

objects of any kind extraneous to the work shall be permitted on the work table.

13. DRYING CABINETS.--If painted work is to remain in the workrooms, cabinets for drying completed work shall be connected with a suction exhaust system to the outside air. This is to prevent the accumulation in the workroom of radon and of vapors from the drying adhesive. These vapors are unpleasant and under certain conditions may be toxic. Finished work shall be removed to drying cabinets promptly so that it does not accumulate near the painting table. The ventilating system is to be so designed that there will be a uniform air movement of approximately 100 linear feet per minute at the face of the cabinet when the doors are opened.

14. REPAIR AND REPAINTING OF LUMINOUS ARTICLES.--Applied radioactive luminous compound is frequently removed preparatory to repainting. To avoid dust, luminous compound shall be removed by scraping under liquid. The liquid bath may be water or an organic solvent. Rubber gloves must be worn when engaged in this process. This worn-out compound contains practically all of the original radium and is just as dangerous to handle as the fresh compound. The liquid scraping bath must be emptied and the pan thoroughly cleaned with wiping papers daily. The liquid of the scraping bath should be emptied directly into the sewage system or deposited in a hole in the earth. Dry scraping must be done under a hood of the same design as the painting hood but provided with an independent exhaust ventilating system which will be capable of producing an air movement of not less than 200 linear feet per minute at the face of the hood opening. The discharged point of the exhaust duct for the scraping hood shall be at least 6 feet above the roof line of the building. The operator shall wear a respirator of the "supplied air" type, Navy Half Mask Type A (BuShips Specification INT 37M3) (Stock Number 37M310). Containers, gloves, and other equipment used for the removal or reclamation of applied radioactive material shall be maintained in a clean condition and free of radioactive material when not in use.

15. DISPOSAL OF EMPTY BOTTLES.--The 1-gram bottles in which the radioactive luminous compound is furnished to the dial painter shall be disposed of in a manner to preclude any possibility of harm to workers or other persons from the small amounts of compound which remain in the containers. If the bottles are to be returned to the manufacturer, they shall never be permitted to accumulate, and if they are to be destroyed, this shall be done under supervision to insure that this destruction is complete and is carried out at a spot remote from human habitation.

16. STORAGE OF RADIOACTIVE LUMINOUS MATERIAL.--Radioactive luminous compound shall be stored in a cabinet located at a sufficient distance from workers so that the gamma-ray exposure for any worker does not exceed 0.1 roentgen per day. This cabinet shall be lined with lead at least 1/2 inch in thickness. All stock of radioactive luminous compound shall be stored in this cabinet and shall be issued to the operators one gram at a time.

17. CLOTHING AND DRESSING ROOMS.--Workers shall be provided with a dressing room where they may change from street clothes into working clothes. Each worker shall be provided with a minimum of two smocks so that one may be laundered each week by the Naval activity. These are for use during working hours and shall not be worn during meal or rest periods or carried away from the plant by the workers. These smocks shall be left in the dressing room at the end of each day. Before soiled clothes are sent to the laundry they shall be examined under an ultraviolet light and radioactive substance shall be removed. Convenient facilities for washing, including solvent and hot water, shall be provided in the dressing room, and supervisors shall insist that the operators scrub their hands thoroughly at the

end of each working period. Workers shall be provided with individual towels and soap. No working equipment of any kind shall be placed or stored in the dressing room.

18. DRINKING FOUNTAINS.--Exclusively of the bubble type, shall be provided in every room in which employees are engaged in the application of radioactive luminous compound. Drinking cups or glasses shall not be used.

V. INSPECTION FOR HAZARDS

1. SUPERVISION.--In every dial-painting plant or shop there shall be a well-trained supervisor whose duties and responsibilities include the inspection of personnel and equipment for possible hazards and the enforcement of safe practices.

2. INSPECTION OF PERSONNEL.--Every person who handles or uses radioactive luminous compound shall perform the inspection under supervision as prescribed in paragraph III 4 and V 2 under a suitable ultraviolet lamp in a dark room adjoining the wash room before lunch and upon termination of work each day. Deposits of such compound thus found shall be removed with solvent and cleansing tissue. Following this inspection and cleaning every person shall wash with soap and warm water and return immediately for re-inspection under the ultraviolet lamp. Such inspection and washing shall be repeated until all radioactive substance has been removed.

3. INSPECTION OF SHOP.--All rooms, furniture, cabinets, trays, racks, oven and wash room fixtures shall be inspected with an ultraviolet light at least once each month and all deposits of radioactive luminous substances thus found shall be removed.

4. INSPECTION FOR GAMMA-RAY EXPOSURE.--To determine the general gamma-ray exposure at points habitually occupied by workers a properly designed ionization or counter device shall be used, by a competent person. Such an instrument shall be sensitive enough and properly calibrated to measure gamma-ray intensities of the order of 0.1 roentgen per day. The exposure shall never exceed the rate of 0.1 roentgen per working day for any operator. In large shops where amounts of radioactive compound handled may vary rapidly, an automatic warning device which gives a visible and audible warning when the safe limit is reached, is helpful in controlling the gamma-ray exposure. The instrument should be tested and calibrated at least once every 6 months, to insure proper operation. In no case, however, should complete reliance be placed on any automatic device for the protection of workers.

5. INSPECTION FOR RADIOACTIVE CONTAMINATION.--The radon content of the air in various workrooms of a dial-painting plant will give a general indication of the amount of contamination present. Test samples of air, taken by filling an evacuated glass bulb of about 1-liter volume and provided with glass stopcocks, shall be analyzed by a competent person as conditions may indicate, such as accidental spillage of compound. If such tests reveal a radon content greater than 10^{-10} curie per liter, a detailed inspection of the plant by means of a suitable Geiger-Muller counter, or other appropriate device, shall be made to locate the source of contamination. Floors, drying racks, work tables, and ventilation ducts shall be given particular attention. Any accumulation of radioactive material thus revealed shall be removed at once.

VI. REPORTS

1. Reports of the above measurements of radon or gamma-ray exposure shall be forwarded to the Assistant Secretary of the Navy (Shore Establishments Division) and to the Chief of the Bureau of Medicine and Surgery together with reports of any steps taken to restore the working space to a safe condition.

2. The results of the physical examinations of persons engaged in this work shall be forwarded to the Chief of the Bureau of Medicine and Surgery for information, study, and correlation with information from other industries engaged in the use of radioactive material.

VII. TRANSPORTATION

The shipment of radioactive luminous compound is restricted by common carrier because of the radium content. Postal regulations prohibit the shipment of radioactive material through the mails. Express companies will ship the compound when packaged and labeled in accordance with their regulations. Persons who desire to ship this compound are advised to consult the local representative of the express company regarding regulations imposed by the company for such shipments.

NAVY DEPARTMENT
WASHINGTON

SOSED-7-RW
NN/P3-1(410224)

23 February, 1942

From: The Secretary of the Navy.
To: Commandants and Commanding Officers, Shore Establishments.
Subject: Industrial Health Program — Duties of Medical Officers for Industrial Hygiene.
Reference: (a) SecNav.'s ltr. SOSED-O-EJ-2/20 NN/P3-1(410224), dated 24 February, 1941.

1. Information is available that certain Commandants, Production Managers, and Senior Medical Officers have regarded the program set forth in reference (a) as unprofitable. In order that the Nation's Industrial health may be conserved, it shall be made a workable program.

2. In some instances the services of the Medical Officer for Industrial Hygiene have not been properly utilized. Reference is to the fact that this Officer, especially trained, has in some instances been used simply as an additional member of the dispensary staff, to the total or partial exclusion of his functions in the field of Industrial Hygiene. Inadequacy of medical personnel cannot be considered to justify this practice. Industrial Hygiene functions as listed below shall constitute the first and primary duty of the Medical Officer for Industrial Hygiene, and other duties, if any, in the Yard or Station Medical Department shall be wholly secondary.

3. The functions of the Medical Officer for Industrial Hygiene, and those of the Safety Officer are separate, though closely correlated. The former includes the study of the natural health hazards of occupational activities, the conduct of the necessary technical surveys to determine potential or existing exposures, and the laboratory analyses to evaluate these exposures. These observations and recommendations should be made available to the Safety Officer who is responsible for the application of the necessary corrective measures.

4. In summary, the suggested functions of the Medical Officer for Industrial Hygiene are;

- (a) To study the occupational health problem.
- (b) To determine the toxicological data in terms of their effect on workers.
- (c) To conduct surveys of potential health hazards in specific activities and processes.

(B)

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Subject: Industrial Health Program -- Duties of Medical Officers
for Industrial Hygiene.

- (d) To collect samples in the field pertaining to occupational health exposures.
- (e) To make laboratory analyses both on samples taken in the field and on any material submitted with reference to the causation of occupational disease.
- (f) To prepare reports of findings, recommendations and conclusions evaluating the hazard of occupational health conditions.

/s/ FRANK KNOX

Department Distribution:

IV, V, VI(a)(b)(c)(d)(e)(1), VII(d)(e)(f),
VIII(g), IX(b) and X(c)