

CHAPTER 12

GAS DEFENSE BILL

12-1 GENERAL:-

The Gas Defense Bill provides a plan and outlines a procedure to be followed to minimize the effects of an attack by chemical agents. It also provides for the care, maintenance and use of individual protective equipment.

12-2 GAS DEFENSE STATIONS:-

Detailed information on Gas Defense and the latest decontamination methods are given in "Chemicals, U.S. Navy, 1942" and "FTP-170-A." Flotilla, Group and Division Commanders have copies of these publications and they should be referred to.

12-3 GAS ATTACK:-

The gas alarm will not be sounded during an engagement with enemy ships or aircraft or at any other time unless the ship has actually been contaminated by a vesicant gas.

If a vesicant gas attack has been received, sound the general alarm immediately and pass the word, "ALL HANDS DON GAS MASKS."

12-4 PROCEDURE:-

The Damage Control parties will take all action required in preparing the ship for attack and in decontamination of the decks and such other parts of the ship as required after gas attack has been made.

The following is an outline of the general procedure to follow in case of gas attacks:-

- (a) When ordered, all hands don gas masks.
- (b) Close all doors, hatches and airports designated in Gas Defense Bill.
- (c) Close off all intakes and exhaust blower vents opening outside by covering with canvas and stuffing with rags.
- (d) Lay out and turn on fire hoses and let the water play on the decks.

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12-5 DECONTAMINATION:-

(a) When to Decontaminate

Decontamination work should be commenced immediately after a vesicant gas attack has been received or as soon thereafter as possible. It should be understood that when a vesicant gas attack is received at night or when the temperature is relatively low, little vapor may be given off, while later, in the warmth of the sun, a high concentration may result. Areas treated during the cool periods of the day should be inspected after the temperature has risen to determine whether further treatment is required.

(b) Decontamination Detail

The Forward and After Repair Parties will act as the Decontamination Detail.

Before beginning decontamination work, each man will don a gas mask and put on protective clothing. The entire body must be protected and each man should be inspected by the Executive Officer (Damage Control Officer) before commencing operations, to insure that they are properly protected.

A medical and first aid station should be set up in the crew's washroom by the Pharmacist Mate, who should be prepared to apply first aid measures in case of necessity, having the necessary solvents or neutralizing agents close at hand. Men should be taught to assist each other in removing clothes used in decontamination work without touching them to the bare skin or contaminating the clothing beneath. Facilities for disposal or cleaning of contaminated clothing should be provided.

(c) Marking Contaminated Areas

All contaminated areas should be roped off; when it is not possible to decontaminate the area

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(c) (cont'd.)

thoroughly, it should be marked with danger signs and sentries posted to warn unauthorized persons against entering such areas.

(d) Decontamination Materials

Vesicant chemical agents may be destroyed or neutralized by other chemicals. No one chemical, however, is effective in all cases. The following materials may be used for decontamination work aboard ship.

(1) Water

(a) Lewisite is readily decomposed by water, therefore liberal wetting down of areas so contaminated is sufficient to destroy this agent. The reaction product of Lewisite and water is a vesicant solid substance; while it gives off little vapor, the solid causes severe burns on contact with the body. Consequently, even long after decontamination of an area exposed to Lewisite, it is dangerous to sit or lie down in the area. After treatment with water, a Lewisite area should, if practicable, be covered with a layer of sand.

(b) Mustard gas is very slowly hydrolyzed by water. The reaction product is non-vesicant. The action of cold water on mustard gas is so slow that it is practically negligible for decontamination purposes; hot water is more effective. However, where there is sufficient drainage, mustard gas will be washed away by water. As it is heavier than water, it will lie for a long period of time at the bottom of pools and puddles, remaining active, though the water over it will retard the escape of mustard vapor.

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(d) (cont'd.)

(2) Bleaching Powder (Chloride of Lime)

(a) This material is a white powder, not very stable, readily giving up its chlorine when exposed to the air or moisture. Consequently, it should be kept in airtight containers and used as soon as possible after removal therefrom. Bleaching powder reacts quickly with mustard gas, forming a non-vesicant compound. In contact with liquid mustard, it reacts violently, not only causing flame but driving off a high concentration of mustard vapor. If the bleaching powder is mixed with sand or earth, this violent reaction does not occur. When mixed with sand or earth the proportion should be about one part of bleaching powder to three parts of sand or earth. One pound of bleaching powder is required per square yard of gassed area.

(b) In the decontamination of equipment, decks, etc., bleaching powder can be more easily and efficiently applied in liquid form with rags or swabs. When used as a liquid solution, the proportion should be about one part of bleaching powder to one part of water.

(c) For decontamination of skin of human beings, chloride of lime in proportion to one part of powder to two parts of water may be used, but this slurry must be removed within five minutes after application, otherwise it may cause irritation to the skin.

(3) Sodium Sulphide

This chemical is used in a one percent aqueous solution. It reacts more slowly

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(d) (cont'd.)

(3) Sodium Sulphide (cont'd.)
than bleaching powder but, since no heat is evolved in the process, mustard vapor is not driven off; the solution is more effective if heated before use. It may be used either as a spray or mixed with sand. In the latter case, one part (by weight) of the liquid is used with four parts of sand and the mixture spread on the contaminated areas. Six gallons of sodium sulphide are needed for each square yard of gassed area.

(4) Green Solution

This solution, which has a greenish color, is prepared by dissolving one pound of bicarbonate of soda (baking soda) in one gallon of commercial hypochlorite solution. This mixture is less efficient for destruction of mustard gas than bleaching powder but it is also less corrosive to metals, hence it is applicable to guns, instruments, etc. It should be generously used with a sponge or rag until surface is clean.

(5) Non-Corrosive Decontaminating Agent

An additional material known as Agent-Decontamination-Non-Corrosive, is prepared by dissolving one pound of solid in fifteen pounds of solvent. This agent is much less corrosive than any of the above. It is suitable for use on leather, cotton fabrics, instruments and other items that might be damaged by the corrosive action of other decontamination materials.

(e) Decontamination Methods

(1) In de-mustardizing a shell hit, not only the shell hole but the entire area of contamination about the point of burst should be treated.

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(e) (cont'd.)

(2)

Contamination is generally greatest in and immediately around the shell hole itself. Pools of liquid mustard gas or large visible splashes on the decks or bulkheads are rarely found. In most cases mustard is only perceptible by its odor. As a rule, one pound of bleaching powder for each square yard of contaminated area is the minimum requirement. Sodium sulphide or green solution may be sprayed over a contaminated shell hole or first mixed with sand and spread with a shovel. Bleaching powder, however, is more effective for this purpose.

(3) Metal Equipment

Greasy or oily metal surfaces contaminated with mustard gas should first be cleaned with kerosene or gasoline. These solvents do not destroy mustard, but dissolve it so that most of it may be removed. Rags used for this purpose should be burned or thrown over the side, as they will be grossly contaminated. After such treatment, a very thin coating of mustard will still remain on the surface of the metal so that it will be dangerous to touch. This is difficult to remove and must be treated with neutralizing chemicals. A solution of bleaching powder mixed with water, hot sodium sulphide, or green solution, are suitable materials to use, the latter two being much less corrosive. To avoid serious corrosion in using bleaching powder mixed with water, the application should not be left on for more than an hour at most. After such treatment, the surface should then be washed, dried, polished, and oiled. The non-corrosive decontaminating agent mentioned under (12-5-d(5)) above, is the

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(e) (cont'd.)

- (3) Metal Equipment (cont'd.)
most satisfactory and effective for use on metal equipment.
- (4) Clothing and Fabric Equipment

(a) Airing

Clothing contaminated by mustard vapor only, may be decontaminated by hanging up the garments so that they will be exposed to the sun and wind. In warm, sunny weather, two days airing generally will be sufficient. Care should be taken not to hang garments close together, especially not on top of each other. In cool cloudy weather, this method should not be relied upon.

(b) Steaming

A more positive method of destroying mustard gas in clothing is to subject it to steam. If contaminated with mustard vapor only, clothing may be decontaminated by two hours steaming. If splashed with liquid mustard, steaming should be continued from four to six hours. Various kinds of steam disinfectors can be improvised aboard ship. The simplest is merely a G.I. can provided with a false bottom which serves to hold the clothing about a foot from the true bottom. Six or eight inches of water is poured into the bottom of the can, the false bottom inserted, and the garments piled in. The can is then placed over a fire, the top being covered but not so tightly as to prevent escape of steam. The capacity of such a disinfecter can be increased by hanging additional clothing in an inverted canvas bag suspended over the

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(e) (cont'd.)

(4) (b) Steaming (cont'd.)
can, the open end of the bag being tied about the sides of the can. Shoes, if only lightly splashed and before mustard has soaked into the leather, may be neutralized by applying bleaching powder or bleaching powder mixed with water. As a safety precaution, it is well for men exposed to mustard gas to shuffle their feet from time to time through a mixture of bleaching powder and sand. Well worn shoe leather absorbs mustard much quicker than new leather.

(5) Compartments and Decks

If a compartment or space, not gas proof has been subjected to vapors from a vesicant agent, the overhead and bulkheads should be sponged or washed with a mixture of bleaching powder and hot water and the decks should receive a thorough scrubbing with the same material. Vertical surfaces should be decontaminated by starting at the upper limit of contamination and working down.

(6) Food and Water

In case canned goods are sprayed with a vesicant agent, the cans should be decontaminated by boiling before they are opened.

Food and water not protected by containers, which have been contaminated by a vesicant agent, are normally discarded. In case there is a shortage of food, special instructions from a medical officer will govern as to its decontamination.

Water contaminated with mustard should be avoided.

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(e) (cont'd.)

(6) Food and Water (cont'd.)

Water contaminated by arsenical agents such as Lewisite and Adamsite, or white phosphorous, cannot be purified and should be discarded.

(7) Guns, Weapons, Equipment and Munitions

(a) Guns, machine guns, rifles and other steel weapons will be rendered useless if long exposed to the corrosive action of vesicant chemical agents. Unpainted working parts are especially vulnerable and as a general precaution should be kept well coated with oil or grease. Weapons should invariably be inspected following gas attacks and, as soon thereafter as practicable, cleaned and re-oiled. Gasoline will remove the old lubricant; water and soap, washing soda, or green solution should be used to clean the affected parts before new lubricant is applied.

If sprayed with mustard gas, weapons must be decontaminated before it is safe to handle them. Bleaching powder mixed with water should be used on the base and outside of barrel of guns, but its use on breech mechanism and other such parts should be avoided because of its corrosive effect. Such parts should be treated as instruments. Alcohol or gasoline, hot water and soap, or other non-corrosive material such as mentioned above should be used to remove mustard. Wooden gun stocks contaminated with mustard should be treated repeatedly.

(b) Ammunition

Since brass shell and cartridge cases are particularly susceptible to corrosion by

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(e) (cont'd.)

(7) (b) Ammunition (cont'd.)
gases like phosgene, ammunition should be kept in sealed containers. If ammunition becomes badly corroded, it may be necessary to discard it or clean it thoroughly before it is used.

(c) Instruments

Instruments such as those used in fire control should be kept in their containers except when in actual use. If exposed to corrosive gases, they should be cleaned with alcohol (or gasoline, if alcohol is not available) at the earliest opportunity, after which their moving parts should be given a thin coating of light machine oil.

(8) Personnel

All personnel that have been contaminated should remove all clothing before entering compartments or washrooms. Enter washroom and take showers, using plenty of soap and hot water.

(9) All ports, doors and hatches, should be opened as soon as decontamination of top side has been completed and all fans and blowers started.

A portable blower should be placed in all compartments that have been contaminated and have no discharge blower or fans.

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