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**UNITED STATES MARINE CORPS**  
THE BASIC SCHOOL  
MARINE CORPS TRAINING COMMAND  
CAMP BARRETT, VIRGINIA 22134-5019

**CHEMICAL, BIOLOGICAL,  
RADIOLOGICAL, AND  
NUCLEAR (CBRN)  
DEFENSE  
B2I3597**

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## CBRN Defense

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### Introduction

Ancient Persians were the first to use chemical weapons when they gassed Roman soldiers with toxic fumes 2,000 years ago. Archeologists have found the oldest evidence of chemical warfare yet after studying the bodies of 20 Roman soldiers' found underground in Syria 70 years ago. Dr Simon James, who solved the mystery, said: "The mixture would have produced toxic gases including sulphur dioxide and complex heavy petrochemicals. The victims would have choked, passed out and then died. I believe this is the oldest archaeological evidence of chemical warfare ever found. This is the beginning of a particularly nasty history of killing that continues up to the modern day."

### Importance

You will benefit from this period of instruction by being able to identify CBRN agents, as well as survive a CBRN attack.

### This lesson covers the following topics:

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### Learning Objectives

#### Terminal Learning Objectives

1. Given a CBRN environment, a field protective mask (SL-3 complete), and CBRN alarm or an order to mask, employ the field protective mask within a time limit of nine seconds of the issuance of the alarm or order. (MCCS-CBRN-1002)
2. Given a unit, a tactical scenario, a training area, and individual protective equipment, employ CBRNE Protective Measures by ensuring complete and serviceable equipment and trained Marines. (MCCS-CBRN-2301)

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## **CBRN Defense (Continued)**

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### Enabling Learning Objectives

1. Without the aid of references, describe CBRN vocal/visual alarms without error. (MCCS-CBRN-1002a)
2. Without the aid of references, describe the MOPP levels without omission. (MCCS-CBRN-2301a)
3. Without the aid of references, identify NATO CBRN markers without omission. (MCCS-CBRN-2301b)
4. Without the aid of references, describe CBRN detection measures without omission. (MCCS-CBRN-2302a)
5. Given a CBRN casualty and a list of symptoms, identify the type of contamination without error. (MCCS-CBRN-2302b)
6. Given a CBRN casualty, treat the casualty to prevent further injury or death. (MCCS-CBRN-2302c)
7. Given a CBRN environment and individual personal protective equipment, identify the purpose of MOPP gear exchange to minimize CBRN casualties. (MCCS-CBRN-2302d)
8. Given a CBRN scenario, identify decontamination equipment without omission. (MCCS-CBRN-2302e)
9. Given a CBRN scenario, identify detection equipment without omission. (MCCS-CBRN-2302f)
10. Given a CBRN scenario, describe the purpose of controlling the spread of contamination without omission. (MCCS-CBRN-2302g)
11. Given a CBRN scenario, describe the steps in a CBRN-1 report without omission. (MCCS-CBRN-2302h)

### **Individual Protective Clothing**

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Protective clothing allows units to continue the mission after a chemical or biological attack while limiting the spread of contamination to the individual.

- Permeable protective clothing allows air and moisture to pass through the fabric. Most personnel use permeable protective clothing such as:
  - Suit, Chemical and Biological Protective, Carbon Sphere (Saratoga).
  - Joint Service Lightweight Integrated Suit Technology (JSLIST) Chemical Protective Ensemble.

#### **Four Components of a Protective Ensemble**

- Chemical protective suit.
- Protective mask.
- Chemical Protective overboots.
- Chemical Protective Glove Set.

## MOPP Analysis

Unit Commanders determine the appropriate MOPP level by assessing Mission, Enemy, Time available, Troops and support available, and Terrain and weather (METT-T) factors. This analysis enhances the probability of mission success by balancing the reduced risk of casualties due to chemical/biological agent exposure against the increased risk of performance decrements and heat strain casualties as MOPP levels increase. Flexibility is the key to providing maximum protection with the lowest risk possible, while still allowing mission accomplishment. **MOPP analysis provides recommended MOPP levels.**

METT-T Factors				
Mission	Enemy	Time available	Troops and support available	Terrain and weather
<ul style="list-style-type: none"> <li>•What is the mission?</li> <li>•What additional protection, such as shelter and cover, is available?</li> <li>•How physically and mentally demanding is the work that must be performed?</li> <li>•How quickly must the mission be accomplished?</li> <li>•What is the expected duration of the mission?</li> <li>•Are adequate food and water supplies available?</li> </ul>	<ul style="list-style-type: none"> <li>•Is an attack probable?</li> <li>• Is an attack imminent or in progress?</li> <li>• Is the immediate area contaminated once the attack is over?</li> <li>• What are the likely targets, threat agents, and warning times?</li> </ul>	<ul style="list-style-type: none"> <li>• What is the time of day/night for completion of the mission?</li> <li>• How much time is available for completion of the mission?</li> <li>• Can completion of the mission be delayed?</li> </ul>	<ul style="list-style-type: none"> <li>• How many personnel are available?</li> <li>• What Individual protective equipment do the personnel possess?</li> <li>• What is the training status of available personnel?</li> </ul>	<ul style="list-style-type: none"> <li>• What are the temperature/humidity?</li> <li>• Is it cloudy, sunny, or windy?</li> <li>• Is the terrain sandy, mountainous or marshy?</li> </ul>

### Components of the Mission Oriented Protective Posture Levels

MOPP Level	Components
MOPP Ready	<ul style="list-style-type: none"> <li>• Protective Mask carried.</li> <li>• Permeable protective ensemble available within two hours. Second ensemble will be available in six hours.</li> </ul>
MOPP ZERO	<ul style="list-style-type: none"> <li>• Protective Mask carried.</li> <li>• Permeable protective ensemble available within arm's reach.</li> </ul>
MOPP1	<ul style="list-style-type: none"> <li>• Protective Mask carried.</li> <li>• Chemical protective trousers and jacket worn.</li> <li>• Within arm's reach are:               <ul style="list-style-type: none"> <li>○ Overboots</li> <li>○ Chemical protective gloves.</li> </ul> </li> </ul>
MOPP2	<ul style="list-style-type: none"> <li>• Protective Mask carried.</li> <li>• Worn are:               <ul style="list-style-type: none"> <li>○ Chemical protective trousers and jacket.</li> <li>○ Overboots.</li> <li>○ Chemical protective gloves within arm's reach.</li> </ul> </li> </ul>
MOPP3	Worn are: <ul style="list-style-type: none"> <li>• Protective Mask.</li> <li>• Chemical protective trousers and jacket with hood.</li> <li>• Overboots.</li> <li>• Chemical protective gloves within arm's reach.</li> </ul>

## MOPP Analysis (Continued)

### Components of the Mission Oriented Protective Posture Levels (Continued)

MOPP4	Worn are: <ul style="list-style-type: none"> <li>• Protective Mask.</li> <li>• Chemical protective trousers and jacket with hood.</li> <li>• Overboots</li> <li>• Chemical protective gloves.</li> </ul>
Mask Only Command	Protective mask is worn.

## Chemical Agents

Agent Characteristic	Identifying Persistency	Identifying Chemical Attacks	Purpose of Chemical Attacks
Persistent	Any chemical agent that stays in an effected area for <i>more than 12 hours</i> .	Defined as air bursting, ground contaminating (i.e., aircraft spray or air bursting munitions).	Long term terrain denial
Non-Persistent	Any chemical agent that stays in an effected area for <i>less than 12 hours</i> .	Defined as Ground bursting, air contaminating (i.e., mortars, rockets, artillery, bombs).	To inflict casualties

## Nerve Agents

In 1936, Germany first developed Tabun as an insecticide. They learned that it was 100-1,000 times more potent than chlorine, which was used in WW I. A few thousandths of a gram proved fatal. Germany began stockpiling this agent at an estimated 70,000 to 250,000 tons by the end of WWII.

### Two Categories of Nerve Agents: nonpersistent and persistent

	Chemical Agent/ Symbol	Appearance 20°C	Odor	Skin and Eye Toxicity	Inhalation Toxicity	Protection Required
	<b>NON-PERSISTENT</b>	Tabun GA	Colorless to brown liquid	Faintly fruity; none when pure	Very high toxicity	Primarily inhalation hazard
Sarin GB		Colorless liquid	None when pure	Very high toxicity	Most toxic route of exposure	MOPP4
Soman GD		Colorless liquid when pure	Fruity; camphor when pure	Very high toxicity	Most toxic route of exposure	MOPP4
Cyclosarin GF		Colorless Liquid	None when pure	Very high toxicity	Most toxic route of exposure	MOPP4
GB2 (Binary Nerve Agent) 2 part weapon, compounds are not chemical agents, components are mixed in flight to form agent, easier and safer storage, transport and disposal						
<b>PERSISTENT</b>	Chemical Agent/ Symbol	Appearance 20°C	Odor	Skin and Eye Toxicity	Inhalation Toxicity	Protection Required
	VX	Colorless Liquid when pure	Odorless when pure	Extremely toxic	Extremely potent	MOPP4

## Nerve Agents (continued)

### Two Categories of Nerve Agents: nonpersistent and persistent (continued)

<b>PERSISTENT</b>	Vx (V-Sub x) "V-gas"	Liquid	Odorless	Extremely toxic	Extremely potent	MOPP4
	VX2 (Binary Agent) 2 part weapon, compounds are not chemical agents, components are mixed in flight to form agent, easier and safer storage, transport and disposal					

## Nerve Agents (continued)

Physiological Action on the Body. Nerve agents are a group of highly toxic chemicals that interfere with signals transmitted through the central nervous system.

Penetration of the Body. The number and severity of the symptoms depend on the quantity of the agent and the route of entry into the body:

- **Eyes:** Symptoms appear very rapidly
- **Respiratory system:** Symptoms appear slower
- **Skin:** Symptoms appear much more slowly.

<b>NERVE AGENT EXPOSURE SYMPTOMS</b>	
<b>MILD SYMPTOMS</b>	<b>SEVERE SYMPTOMS</b>
<ul style="list-style-type: none"> <li>• Unexplained runny nose</li> <li>• Severely pinpointed pupils</li> <li>• Unexplained, sudden headache</li> <li>• Sudden drooling</li> <li>• Difficulty in seeing (dimness of vision (miosis))</li> <li>• Tightness in the chest or difficulty in breathing</li> <li>• Wheezing and coughing</li> <li>• Localized sweating and muscular twitching in the area of the contaminated skin</li> <li>• Stomach cramps</li> <li>• Nausea with or without vomiting</li> <li>• Tachycardia (A rapid heart rate, usually greater than 100 beats per minute) followed by bradycardia (heart rate less than 50)</li> </ul>	<ul style="list-style-type: none"> <li>• Strange or confused behavior</li> <li>• Increased wheezing, severe difficulty in breathing, and coughing</li> <li>• Red eyes with tearing</li> <li>• Vomiting</li> <li>• Severe muscular twitching and general weakness</li> <li>• Involuntary urination and defecation</li> <li>• Convulsions</li> <li>• Unconsciousness</li> <li>• Respiratory failure</li> <li>• Bradycardia</li> <li>• Coma / DEATH</li> </ul>

**WARNING:** Casualties with severe symptoms will not be able to treat themselves and must receive prompt buddy aid and follow on medical treatment if they are to survive.

Protection Required: Due to the fact that nerve agents may enter the body through various routes of entry, total body protection is necessary. Always don MOPP4.

### **Nerve Agent Medicants**

<b>Nerve Agent Antidote Kit MK I (NAAK MK I)</b>	<b>Antidote Treatment Nerve Agent Auto-Injector (ATNAA)</b>	<b>Convulsion Antidote for Nerve Agents (CANA)</b>
<ul style="list-style-type: none"> <li>• Three kits are issued to each Marine</li> <li>• Stored inside the mask carrier</li> <li>• Each kit is a set of 2 automatic injectors one contains               <ul style="list-style-type: none"> <li>○ 2 mg of Atropine</li> <li>○ 600 mg of 2PAMC1</li> </ul> </li> <li>• A plastic clip holds the injectors together</li> </ul>	<ul style="list-style-type: none"> <li>• Single auto-injector that can be used instead of the NAAK Mark I when available.</li> </ul>	<ul style="list-style-type: none"> <li>• An auto injector containing a 2-milliliter volume of Diazepam, an anti-convulsant</li> <li>• Never used for self-aid</li> <li>• Used only for buddy aid.</li> </ul>

## Blood Agents

### Standard Blood Agents and Their Characteristics

**\*\*All blood agents are classified as *non-persistent*.**

Chemical Agent/ Symbol	Appearance 20°C	Odor	Skin and Eye Toxicity	Inhalation Toxicity	Protection Required
Hydrogen Cyanide AC	Colorless liquid	Bitter Almonds; peach kernels	None	Can cause death within minutes	MOPP4
Cyanogen Chloride CK	Colorless gas	Lacrimatory and irritating	Irritation to eyes	Can cause death within minutes	MOPP4
Arsine SA	Colorless gas	Disagreeable; garlic-like	Liquid exposure causes frostbite	Acute toxicity is high	MOPP4

Physiological Action on the Body. Blood agents prevent cell respiration and the normal transfer of oxygen from the blood to the body tissue.

#### Blood Agent Penetration of the Body.

- **Eyes:** Toxicity is moderate
- **Respiratory System:** Main entrance to the body.
- **Skin:** Are not able to be absorbed through the skin in sufficient dosages to cause casualties.

### Symptoms of Blood Agent Poisoning

Agent	Poisoning Symptoms
AC	<p>High concentrations</p> <ul style="list-style-type: none"> <li>• Increased depth of respiration within a few seconds</li> <li>• Violent convulsions after 20-30 seconds</li> <li>• Stop breathing within 1 minute</li> <li>• Heart stops within a few minutes</li> <li>• Skin, lips, and fingertips will have a pink color</li> </ul> <p>Moderate concentrations</p> <ul style="list-style-type: none"> <li>• Dizziness, nausea, and headache appear very early</li> <li>• Convulsions and death</li> </ul> <p>Long exposure to low concentration</p> <ul style="list-style-type: none"> <li>• Lack of oxygen to muscles may cause damage to the central nervous system</li> <li>• Coma and convulsions may last for several hours or days</li> <li>• Irrationality, altered reflexes, and unsteady gait which may last for several weeks or longer</li> <li>• Recovery is complete</li> </ul>
CK	<p>A combination of AC and lung irritant; due to the intense irritant effect symptoms may not be noticed</p> <ul style="list-style-type: none"> <li>• Immediate, intense irritation to the nose, throat and eyes</li> <li>• Coughing, tightness in the chest, heavy flow of water from the eyes</li> <li>• Dizziness, unconsciousness</li> <li>• Breathing stops and death occurs in a few minutes</li> <li>• Convulsions, retching and involuntary urination and defecation may occur</li> <li>• If the effects are not fatal, persistent cough, bloody sputum, and abnormal (bluish, grayish, dark purple) skin color may appear</li> </ul>
SA	<p>Slight exposure: headache, uneasiness Moderate exposure: chills, nausea, vomiting Severe exposure: anemia</p>

## Blister Agents

### Aid for Blood Agent Poisoning

Step	Self-Aid	Buddy Aid
1	Stop breathing, don, clear, and check your mask.	Ensure everybody's mask is on. If not, provide assistance.
2	Pass the alarm.	Pass the alarm. Notify a corpsman if a fellow Marine shows symptoms.

### Standard Blister Agents and Their Characteristics

All blister agents are *persistent*

Mustards					
Chemical Agent/ Symbol	Appearance 20°C	Odor	Skin and Eye Toxicity	Inhalation Toxicity	Protection Required
Distilled Mustard HD	Pale yellow-dark brown oily liquid; colorless when pure	Garlic-like or horseradish	Eyes very susceptible to low concentrations;	Most toxic route of	MOPP4
Nitrogen Mustard HN-1	Dark oily liquid; colorless when pure	Faint, fishy or soapy			

Arsenicals					
Chemical Agent/ Symbol	Appearance 20°C	Odor	Skin and Eye Toxicity	Inhalation Toxicity	Protection Required
Lewisite L	Brown liquid; colorless when pure	Geranium-like; none if pure	Extremely irritating to the eyes and produces copious tearing; immediate burning sensation on skin	Toxic lung irritant	MOPP4
Mustard-Lewisite HL	Liquid	Garlic-like (HD)	Equal to L in vesication action; both H and L are irritating to the eyes.		
Phenyl-dichloroarsine PD	Colorless-yellow liquid	None	Fairly potent vesicant		
Ethyl-dichloroarsine ED	Colorless liquid	Fruity, biting, and irritating	Fairly potent vesicant and lacrimator		
Methyl-dichloroarsine MD	Colorless liquid	Extremely irritating; none when pure	Blistering action less than that of HD and L; eye and skin irritant		

## Blister Agents (Continued)

### Standard Blister Agents and Their Characteristics (Continued)

Urticants					
Chemical Agent/ Symbol	Appearance 20°C	Odor	Skin and Eye Toxicity	Inhalation Toxicity	Protection Required
Phosgene Oxime CX	Colorless, crystalline, deliquescent solid when pure	Unpleasant and irritating; low concentration resembles new-mown hay	Causes pain, irritation and severe tissue damage on skin. Causes pain, conjunctivitis and inflammation of the cornea of the eye.	Can cause pulmonary edema	MOPP4

Physiological Action on the Body. Blister agents damage any tissue with which they come into contact.

Penetration of the Body. Blister agents can enter through any of the normal channels (skin, eyes, respiratory tract, and digestive tract).

### Symptoms of Blister Agent Exposure

	Mustards	Arsenicals	Urticants
<b>Eyes</b>	<ul style="list-style-type: none"> <li>The most susceptible</li> <li>From 1-12 hours after exposure, depending on exposure, swelling of the soft, thin tissue around the eyes</li> <li>May also be</li> <li>Gritty sensation in the eyes</li> <li>Visible burns</li> <li>Severe lacerations</li> </ul>	<ul style="list-style-type: none"> <li>Liquids cause severe and immediate damage.</li> <li>Immediate pain and eyelid twitching.</li> <li>Swollen shut in 1 hour.</li> </ul>	<ul style="list-style-type: none"> <li>Violent irritation from vapors</li> <li>Heavy watering of the eyes</li> </ul>
<b>Skin</b>	<ul style="list-style-type: none"> <li>Hot, humid weather increases the action</li> <li>Different phases               <ul style="list-style-type: none"> <li>Latent period, the time directly after exposure: For liquids, from 1-24 hours; for vapors, may be several days. No noticeable damage</li> <li>Erythema period, the second phase: Skin looks similar to sunburn: affected area turns red and gets brighter and may also swell. In severe burns, may limit the motion of a limb</li> <li>Vesication period: Blistering begins or increases. Small sores may form first and combine to form the blisters. At first, fluid inside the blister is almost clear and later starts yellowing. Fluid is not mustard</li> <li>Resorption period: About 1 week after exposure. Blister fluid is resorbed into the body.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Liquids produce more severe sores on the skin than does mustard</li> <li>10-20 seconds after exposure, stinging pain</li> <li>At about 5 minutes, reddening of the skin, more pain, and itching</li> <li>In 12 hours, blisters are well developed and painful</li> <li>In 48-72 hours, the pain lessens</li> </ul>	<ul style="list-style-type: none"> <li>Immediate, severe burning with intense pain and numbness</li> <li>White area with a swollen ring around it appears within 30 seconds</li> <li>A wheal forms in 30 minutes</li> <li>The white area turns brown in 24 hours</li> </ul>

**Note:** Protection Required: Because blister agents attack any tissues with which they come into contact, whole body protection is needed. Don MOPP4 immediately.

## Blister Agents (Continued)

### Aid for Blister Agent Poisoning

Step	Self Aid	Buddy Aid
1	Stop breathing, don, clear, and check the protective mask.	Ensure everyone's mask is on. If not, assist them.
2	Pass the alarm.	Pass the alarm.
3	Immediately decontaminate eyes with water and skin with the M291 Skin Decontamination Kit.	Ensure immediate decontamination of personnel.
4	Following decontamination, don MOPP4	After decontamination, make certain that all personnel are in MOPP 4.
5	Once blisters form, cover them with a sterile bandage. If possible, avoid breaking the blisters; secondary infection may result.	

## Choking Agents

### Standard choking agents and their characteristics

Chemical Agent/ Symbol	Appearance 20°C	Odor	Skin and Eye Toxicity	Inhalation Toxicity	Protection Required
Phosgene CG	Colorless gas that is readily liquefied	Musty hay or rotting fruit	Initial effects resemble those of tear gas	Causes pulmonary edema	Protective mask
Diphosgene DP	Colorless oily liquid	Musty hay	Lacrimator	Causes pulmonary edema	Protective mask

Physiological Action on the Body. Choking agents cause damage to lung tissue. Inside the body, they cause the cells of the lungs to swell and release fluid (pulmonary edema, also called “dry-land drowning”), which impairs the ability to breathe.

Penetration of the Body. Because it attacks the respiratory system, the point of entry is through inhalation.

### Symptoms of Choking Agents

Time Period	Symptoms
During and Immediately After Exposure	<ul style="list-style-type: none"> <li>• Coughing</li> <li>• Choking</li> <li>• Tightness in the chest</li> <li>• Nausea</li> <li>• Occasionally headache, watering of the eyes, and vomiting</li> </ul>
Internal	<ul style="list-style-type: none"> <li>• A period after exposure in which the victim may be symptom free</li> <li>• Commonly lasts 2-24 hours, but may be shorter</li> </ul>
After Initial Exposure	<ul style="list-style-type: none"> <li>• Difficulty in breathing, rapid shallow breathing, possible skin color change.</li> <li>• Discomfort, apprehension and labored breathing followed by frothy sputum.</li> <li>• Shock-like symptoms such as pale, clammy skin may also appear</li> </ul>

## Choking Agents (Continued)

### Aid for Choking Agents

Step	Self Aid	Buddy Aid
1	Stop breathing, don, clear, and check your mask.	Ensure everyone's mask is on. If not, provide assistance.
2	Pass the alarm.	Pass the alarm.
3	Normal combat duties should continue unless there is respiratory distress.	Have the casualty rest and stay warm if possible. Keep the casualties sitting upright.
4	If possible, stay warm and rest. Work will increase the effects due to an increase in your breathing rate.	Be alert for the signs of shock and treat as necessary.
5	Do not lay down flat. Sit up and rest.	If casualty is to be moved by stretcher, do <u>not</u> let him lie down. This will cause the fluid in his lungs to possibly choke him.

## Biological Agents

History teems with examples of biological research and warfare. To eliminate a threat from Native Americans, in 1763 the British commander at Fort Pitt distributed blankets and handkerchiefs contaminated with small pox. This action effectively eliminated the Native American problem. Due to their low cost and ability to procure and conceal easily, biological weapons have been used throughout history.

\*\*The terms persistent and non-persistent describe the continuing hazard posed by the agent remaining in the environment and should not be used to classify biological agents.

### Types of Biological Agents

#### Pathogens

Disease-producing microorganisms that are either:

- Naturally occurring; (bacteria, rickettsiae, fungi, viruses)
- Altered by genetic engineering

While the vast majority of microorganisms are harmless or even helpful, about 100 naturally occurring pathogens could be used as biological warfare agents. Pathogens can be further classified as:

- Transmissible agents cause disease that are contagious from person to person, which can lead to an epidemic. Others occur primarily in animals, but can be spread naturally to humans.
- Non-transmissible agents cannot spread from person to person, such as toxins, because they are inert and are therefore non-contagious.

#### Toxins

Are poisonous substances, highly toxic to man, produced as by-products of microorganisms, plants, and animals.

- Chemically synthesized.
- Artificially produced with genetic engineering techniques
- Toxins are nonliving materials so they are:
  - Stable.
  - Readily available.
  - Easy to manage.

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## Biological Agents (Continued)

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- Toxins can be disseminated in the same manner as chemical agents (extremely important because of the threat they can present in biological warfare).
- Toxins exert their lethal or incapacitating effects by interfering with certain cell and tissue functions.
- Toxins are classified as
  - Neurotoxins, which disrupt nerve impulses.
  - Cytotoxins, which destroy cells by disrupting cell respiration and metabolism

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## Detection Kits

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Once a unit is attacked with chemical weapons or suspects that chemical agents are present, it must have a way of verifying the chemical presence and type. Without this ability Marines would not be able to survive and fight on the battlefield. Imagine a whole battalion of Marines, almost 1,000 strong, walking through an area that is contaminated. The resulting scene would be devastating and chaotic.

### M256A1 Chemical Agent Detector Kit

Description: Each kit consists of 12 disposable sampler-detectors, one booklet of M8 paper, and a set of instruction cards attached by a lanyard to a plastic carrying case. The case is made from molded, high-impact plastic and has a nylon carrying strap and a nylon belt attachment. Each sampler-detector contains a square impregnated spot for blister agents, a circular test spot for blood agents, a star test spot for nerve agents, and a lewisite-detecting tablet and rubbing tab. The test spots are made of standard laboratory filter paper. There are eight glass ampoules, six containing reagents for testing and two in an attached chemical heater. When the ampoules are crushed between the fingers, formed channels in the plastic sheets direct the flow of liquid reagent to wet the test spots. Each test spot or detecting tablet develops a distinctive color which indicates whether a chemical agent is or is not present in the air.

Capabilities: The kit is a portable, expendable item capable of detecting and identifying hazardous concentrations of chemical agents and is used after a chemical attack to determine if it is safe to unmask or reduce the protective posture level. It also determines the type of agent present or confirms the absence of a hazardous concentration of agent.

Limitations: Do not hold the sampler-detector in direct sunlight while exposing test spots. Prior to breaking glass ampoules (except heater ampoules), place one heater pad on each side of the sampler-detector, covering the ampoule to be broken. These pads will prevent pieces of glass from cutting your gloves or hands. Avoid vapors that may burn while crushing heater ampoules. Hold sampler-detector down to one side while vapors are venting. Avoid sampling in smoke from burning debris because results may not be accurate. Each sampler-detector contains some hazardous materials; therefore, used or expired kits must be disposed of in accordance with local procedures.

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## Detection Kits (Continued)

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- M8 Chemical Agent Detector Paper
  - It comes in a booklet with 25 sheets of chemically treated impregnated paper, perforated for easy removal. The 25 sheets may be torn in two to conduct 50 separate tests. A color comparison chart is printed on the inside of the front cover of the book.
  - Capabilities M8 detector paper is used to detect the presence of liquid V, G, or H.
  - Limitations It cannot be used to detect vapors or chemical agents in water or petroleum products. It may give false readings.
  - Function When M8 paper is brought into contact with liquid nerve or blister agents, it reacts with chemicals in the paper to produce specific color changes:
    - f* Yellow indicates presence of G-agent.
    - f* Red indicates presence of blister agents (H, L, and CX).
    - f* Dark green indicates presence of V-agent.
  
- M9 Chemical Agent Detector Paper
  - The paper is issued in a 7-ounce dispenser box that contains one 30-foot roll of 2-inchwide detector paper and plastic storage bags. The paper has an adhesive back for attaching to equipment and clothing.
  - Capabilities To detect the presence of liquid V, G, and H chemical agents.
  - Limitations
    - f* It cannot be used to detect vapors or chemical agents in water.
    - f* It will not stick to dirty, oily, or greasy surfaces.
    - f* Contamination indications cannot be read under a red light or by a color-blind soldier.
    - f* The following can cause false readings:
      - Temperatures above 125°F.
      - Brake fluid.
      - Aircraft cleaning compound.
      - Petroleum products.
      - Insect repellent.

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## Decontamination

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The modern day battlefield is full of potential risks from conventional weapons. When exposed to the added threat of unconventional weapons, it becomes necessary to possess the appropriate skills and equipment needed to survive a CBRN attack. Using decontamination equipment is one effective means of combating an attack.

**Reactive Skin Decontamination Lotion (RSDL)** The FDA has approved RSDL for use by the US military.

Description RSDL is a broad-spectrum liquid CW agent decontaminant that will remove and destroy military chemical agents on contact. After CW agent destruction, RSDL leaves a nontoxic residue that may be washed off with water. It does not need to be

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## Decontamination (continued)

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removed immediately. RSDL is safe for use on all intact skin surfaces and for limited duration use in the eyes. RSDL reacts rapidly, providing the full removal and destruction of CW agents within 2 minutes, enabling efficient decontamination of casualties. The RSDL kit is fielded with three kits per package.

**Mission** The RSDL is used to decontaminate intact skin only. It is impregnated in a sponge pad and packaged as a single unit in a heat-sealed foil pouch. When exposed to CW agents, the user wipes the exposed skin with the lotion.

**Capabilities** RSDL acts within seconds of being applied to the skin, neutralizing the toxicity of chemical agents by breaking down their molecules. Apply the lotion within 1 minute of contamination. The lotion is effective against cutaneous nerve and blister agents, such as mustard, GB, and VX.

### Eye Decontamination

Step	Action
1	Take out your canteen (not the canteen with the M1 drinking cap).
2	Open your canteen.
3	Lean forward with your head away from your clothing.
4	Stop breathing.
5	Lift your mask so it sets on top of your head.
6	Tilt your head to the right.
7	Place open end of your canteen at the bridge of your nose between both eyes.
8	Pour water into your right eye. <b>NOTES:</b> Do not rub. Keep water from your clothing.
9	Now tilt your head to the left.
10	Pour water into your left eye. <b>NOTES:</b> Do not rub. Keep water from your clothing.
11	Replace mask, clear it, and check it. Resume normal breathing.
12	Replace your canteen cap.
13	Put canteen back into canteen carrier and secure snaps.

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## CBRN Defense Alarms, Signals, and Immediate Action

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### Indicators of CBRN Attacks

Enemy chemical, biological, radiological and nuclear attacks *may* come with little or no warning. Your ability to recognize attack indicators will increase the speed at which you react to a CBRN attack, which will increase your chances of survival.

- Nuclear Attack Indicators:
  - Bright flash, enormous explosion, high winds, and mushroom-shaped cloud.
- Biological Attack Indicators:
  - Aerosols, liquid droplets or dry powder.
    - Biological attack indicators fall into two groups:

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## **CBRN Defense Alarms, Signals, and Immediate Action (continued)**

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- High probability indicators. Attacks with biological agents will be very subtle if favorable weather conditions prevail. Symptoms can appear from minutes to days after an attack has occurred. High probability indicators may be:
  - Mysterious illness: many Marines and civilians sick for unknown reasons.
  - Large numbers of or unusual insects.
  - Large number of dead wild or domestic animals.
  - Mass casualties with:
    - f* Flu-like symptoms.
    - f* Fever.
    - f* Sore throats.
    - f* Skin rash.
    - f* Mental abnormalities.
    - f* Pneumonia.
    - f* Diarrhea.
    - f* Dysentery.
    - f* Hemorrhaging.
    - f* Jaundice.
- Possibility indicators:
  - Artillery shells with less powerful explosions than High Explosive (HE) rounds.
  - Aerial bombs that “pop” rather than explode.
  - Mist or fog sprayed by aircraft or aerosol generators.
  - Unexploded bomblets found in the area.
- Chemical Attack Indicators.
  - Explosive shells, rockets, missiles, aircraft bombs, mines, and spray devices. Also, either water-soluble or miscible liquids or solids may potentially contaminate water supplies.
    - High probability indicators
      - Activation of chemical alarms.
      - Positive reading on chemical agent.
        - Detector paper.
        - Monitor.
      - Marines experiencing symptoms of chemical agent poisoning such as:
        - Irritation of the eyes, nose, throat, and skin.
        - Headache.
        - Dizziness.
        - Nausea.
        - Difficulty with or an increase in the rate of breathing.
        - Choking.
        - Tightness in the chest.
    - Mist or fog sprayed by aircraft.

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## **CBRN Defense Alarms, Signals, and Immediate Action (Continued)**

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- Possibility indicators. Indicators of a possible chemical attack are any:
  - Artillery shells with less powerful explosions than HE rounds.
  - Aerial bombs that “pop” rather than explode.
  - Unexploded bomblets found in the area.

### **Automatic Masking**

Automatic masking is the act of immediately masking and assuming MOPP4 when encountering chemical/ biological attack indicators on the battlefield. When high probability indicators are present, Marines will automatically mask before initial chemical/biological weapons usage is confirmed. Once chemical/ biological agents have been employed, commanders at all levels may establish a modified automatic masking policy by designating additional events as automatic masking criteria. Once this policy is disseminated, Marines will mask and assume MOPP4 automatically whenever one of the designated events occurs.

If individuals find themselves alone without adequate guidance, they must mask immediately and assume MOPP4 whenever:

- Their position is hit by artillery, mortar fire, rocket fire, or by aircraft bombs, and chemical agents have been used or the threat of their use is significant.
- Their position is under attack by aircraft spray.
- Smoke or mist of an unknown source is present or approaching.
- A suspicious odor, liquid, or solid is present.
- A chemical or biological attack is suspected.
- Unexplained laughter or unusual behavior is noted in others.
- Buddies suddenly collapse without evident cause.
- Animals or birds exhibit unusual behavior and/or sudden unexplained death.
- They have one or more of the following signs or symptoms:
  - An unexplained sudden runny nose.
  - A feeling of choking or tightness in the chest or throat.
  - Blurring of vision and difficulty in focusing the eyes on close objects.
  - Irritation of the eyes, this could be caused by the presence of several chemical agents.
  - Unexplained difficulty in breathing or increase in breathing.
  - Sudden feeling of depression.
  - Anxiety or restlessness.
  - Dizziness or light-headedness.
  - Slurred speech.

Once Marines are under attack, they must warn others of the hazard. Early warning gives others more time to react; this additional time saves lives and increases mission effectiveness. Apply the following rules when giving the alarm:

- Give the alarm as soon as an attack or a hazard is detected.
- Use an alarm method that cannot be confused easily with normal combat signals or sounds. Personnel should warn others using one or a combination of the four types of alarms/signals for warning personnel of an attack:
  - Vocal,

## CBRN Defense Alarms, Signals, and Immediate Action (Continued)

- Visual,
- Sound,
- Audiovisual.
- All who hear or see the alarm must repeat it swiftly throughout the unit because of its limited range.
- Supplement the alarm over radio and telephone nets.

### Alarm Methods

<b>Vocal</b>	<p>The spoken word (vocal alarm signal) is the first way to inform troops of a CBRN hazard or attack. The vocal alarm for:</p> <ul style="list-style-type: none"> <li>• Any chemical or biological hazard or attack is the word “GAS!” Use the word “SPRAY!” for an aircraft spray attack. <ul style="list-style-type: none"> <li>○ The person giving the alarm masks first and then shouts “GAS!” as loudly as possible.</li> <li>○ Everyone hearing this alarm immediately masks and then repeats the alarm.</li> </ul> </li> <li>• The arrival of radiological contamination in a unit area is the word “FALLOUT!” <ul style="list-style-type: none"> <li>○ The first person to detect the arrival of fallout will usually be a radiological monitor operating a radiacmeter at the unit command post (CP). When this radiacmeter records an increase in dose rate to 1 centigram per hour or higher, the monitor should immediately alert unit personnel by shouting “FALLOUT!”</li> <li>○ Everyone hearing this alarm takes cover immediately and then repeats the alarm.</li> </ul> </li> </ul>
<b>Visual</b>	<p>The visual alarm is always used in conjunction with the vocal alarm. It reinforces the vocal alarm to warn of the imminent arrival or the presence of CBRN hazards. The visual alarm is a standard hand-and-arm signal that consists of the following steps:</p> <ul style="list-style-type: none"> <li>• Don, clear, and check the protective mask.</li> <li>• Extend both arms horizontally sideways with clenched fists facing up.</li> <li>• Move the fists rapidly to your head and back to the horizontal position.</li> <li>• Repeat as necessary.</li> </ul>
<b>Sound</b>	<p>Sound signals reinforce vocal and visual alarms to warn of the imminent arrival or the presence of CBRN hazards. Sound signals consist of a succession of short signals. Examples of sound signals include:</p> <ul style="list-style-type: none"> <li>• Rapid and continuous beating on any metal object or any other object that produces a loud noise.</li> <li>• A succession of short blasts on a vehicle horn or other suitable device, in a ratio of 1:1 (approximately 1 second on and 1 second off).</li> <li>• An interrupted 10-second warbling siren sound and vocal alarms in situations in which the sound is lost because of battlefield noises or in which sound signals are not permitted.</li> </ul>
<b>Audiovisual</b>	<p>If the automatic chemical agent alarms are in operation, detected agents will trigger a visual and auditory alarm unit. The person who sees or hears an alarm signal from the alarm unit immediately masks and augments this signal with the vocal signal. Radio/telephone operators who hear the vocal signal immediately mask and relay the signal over the unit radio and telephone nets. Personnel reinforce this signal with other sounds or visual signals.</p>

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## **CBRN Defense Alarms, Signals, and Immediate Action (Continued)**

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- **Actions Performed Before a CBRN Attack**
  - Hardening Positions and Protecting Personnel
    - Hardening includes anything that makes a unit more resistant to the effects of enemy strikes. This reduced vulnerability makes a unit a less lucrative target. Hardening includes:
      - Ready the positions
        - Hardening of positions includes all actions to make them more resistant to the blast effects of conventional or nuclear weapons, heat and radiation of nuclear weapons, and to the contamination of biological or chemical weapons.
        - Foxholes and bunkers with strong waterproof overhead cover
        - Tanks and other armored vehicles in defilade
        - Existing natural and man-made features, such as caves, culverts, tunnels, and empty storage bunkers.
        - Each unit establishes a command post in a protected or built-up area to provide maximum protective shelter for off-duty personnel and critical equipment.
        - Route reconnaissance locates handy shelters, such as culverts and overpasses.
        - Commanders schedule stops near these shelters.
      - Ready the personnel
        - Ordinary garments offer significant protection from flash burns of a nuclear explosion.
        - Under battlefield nuclear warfare (BNW) conditions, personnel use gloves, scarves, and headgear to protect normally exposed portions of the body; these items should be made readily available.
        - Under the threat of enemy chemical/biological attacks, leaders ensure protective equipment is prepared and readily available and that the unit maintains good field sanitation and personal hygiene.
      - Positioning alarms and monitors
        - Units position organic systems to detect chemical contamination or nuclear fallout.
        - They position alarms upwind of friendly positions.
        - Unit personnel place detector paper in positions that give them maximum exposure to chemical agents.
        - Leaders disperse radiological monitoring teams for best coverage of potential radiological contamination.
- **Before Nuclear Attack:**
  - Prepare personnel tactically and psychologically for nuclear defense.
  - Instruct personnel on the effects of a nuclear detonation.
  - Indoctrinate personnel in the protective measures for blast, heat, and nuclear radiation.
  - Be alert for the following indications of nuclear attack:

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## **CBRN Defense Alarms, Signals, and Immediate Action (Continued)**

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- Appearance of enemy personnel wearing special equipment and clothing.
    - Unusual enemy movement or withdrawal from forward areas.
    - Registration of heavy artillery with high air bursts.
    - Harden positions.
  - **Before Biological Attack:**
    - Ensure personnel receive all immunizations and medications.
    - Provide personnel with serviceable protective masks.
    - Instruct personnel in the proper wearing and maintenance of the protective mask.
    - Maintain physical fitness of the unit through physical conditioning exercises and attention to personal cleanliness and field sanitation. Effective control of rodents and insects is a hygiene priority.
    - Permit personnel to eat and drink only approved food and water.
    - Instruct personnel on biological attack indicators.
    - Alert higher headquarters and subordinates of a possible attack.
  - **Before Chemical Attack:**
    - Conduct a thorough training program to indoctrinate personnel on the various characteristics of the agents and the three phases of defensive operations: detection, protection, and decontamination.
    - Conduct training in the use of special equipment used to identify and detect chemical agents.
    - Provide personnel with protective masks and other protective and detection equipment.
    - Ensure personnel are trained in the use of self-protection, first-aid methods, and antidotes.
    - Conduct training in decontamination procedures.
    - Instruct personnel on chemical attack indicators.
    - Ensure personnel are alert to detect and sound the alarm for a chemical attack.
  - **Action Performed During a CBRN Attack.** Personnel must immediately act to reduce the impact of a CBRN attack. Specific actions will vary according to the type of attack.
  - **During Nuclear Attack.** An enemy nuclear attack would normally come without warning. The first indication is a flash of intense light and heat. Induced radiation arrives with the light. Blast and hurricane-like winds follow within seconds. Initial actions must, therefore, be automatic and instinctive — Drop immediately and cover exposed skin to protect against the blast and thermal effects.
    - If exposed when a detonation occurs, Marines must:
      - Immediately drop facedown. A log, large rock, or any depression in the earth's surface provides some protection.
      - Close eyes. Protect exposed skin from heat by putting hands and arms under or near the body and keeping the helmet on.
      - Remain facedown for 90 seconds or until the blast wave passes and debris stops falling.
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## **CBRN Defense Alarms, Signals, and Immediate Action (Continued)**

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- Stay calm. Cover mouth with damp cloth and check for injury. Check weapons and equipment damage. Prepare to continue the mission.
- Marines in fighting holes can take additional precautions. The fighting hole puts more earth between Marines and the potential source of radiation.
  - They can curl up on one side, but the best position is on the back with knees drawn up to the chest. This belly up position may seem more vulnerable, but arms and legs are more radiation-resistant and will protect the head and trunk.
  - Store bulky equipment, such as packs or radios, in adjacent pits if they prevent Marines getting low in their fighting positions, or place these items over the face and hands for additional radiation and blast protection.
- **During Biological Attack.** Marines must automatically mask when they recognize biological attack indicators.
  - Putting on the protective mask and keeping clothing buttoned up protects adequately against living biological agents, as well as applying insect spray or repellent. But, an agent can gain entry through clothing using two routes:
    - Openings, such as buttonholes, zipped areas, stitching, and poor sealing at ankles, wrist, and neck.
    - Through minute pores in the fabric of clothing.
  - Putting on the protective ensemble (MOPP gear) greatly increases the protection level of personnel.
  - Toxins require the same amount of protection as liquid chemical agents.
  - Since no rapid-warning biological agent detection device is fielded, consider any known agent cloud as a chemical attack. Take the same actions prescribed for a chemical attack. To counter a biological attack; protective measures must be initiated before an attack.
- **During Chemical Attack.** Warning of a chemical attack may come from automatic alarm, vocal or visual signal, color change of detector paper, or symptoms observed in oneself or another.
  - The first reaction to recognizing chemical attack indicators should always be to mask up and then give the alarm.
  - Personnel take whatever cover is readily available to reduce the contaminants landing on the body. For aerial spray attacks this will involve crouching on the ground and completely covering oneself with the poncho.
  - Personnel conduct immediate decontamination as necessary to remove all contaminants from the skin.
  - Liquid chemical agents can penetrate normal clothing, leather boots, and gloves; personnel must don MOPP4 for full protection.
  - If over-garments are not available at time of attack, personnel must use field-expedient protection measures. For example, as a temporary expedient, personnel can use their protective mask with hood, protective gloves, wet weather parka, utility uniform, field boots, load-bearing equipment, etc. However, the poncho provides protection for only 1 to 3 minutes as a cover against a liquid chemical agent.

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## **CBRN Defense Alarms, Signals, and Immediate Action (Continued)**

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- **Action Performed After a CBRN Attack**. Following a CBRN attack, post-strike actions must be accomplished to restore fighting power and prepare to continue the mission.
  - **After Nuclear Attack**: Post-strike actions include damage assessment and restoration of combat power. Leaders must maintain control and take contingency actions quickly. Replace cover and ready weapon systems to restore fighting power. Action must also be taken to prepare for fallout. As a minimum, unit:
    - Personnel cover fighting holes and shelter openings.
    - Radiac operators begin continuous monitoring.
    - Personnel cover exposed skin with their poncho or don MOPP gear.
    - Personnel cover their mouths with handkerchiefs to reduce the probability and amount of contaminants entering the lungs. This method, generally preferable to masking, avoids trapping contaminants in the mask filter.
  - **After Biological Attack**. Actions after a biological attack include taking samples, identifying a casualty by the symptoms they exhibit, and treating those symptoms. Early recognition of symptoms and their treatment will decrease recovery time and hopefully decrease fatalities. Personnel:
    - Should strive to keep their bodies, clothing, and living areas clean.
    - Must observe each other for illness. Sickness may not occur for a few hours to days after a biological attack.
    - Must start decontamination measures:
      - Boil water for 15 minutes if not sealed.
      - Boil or wash sealed containers of food thoroughly before the seal is broken.
      - Expose contaminated objects to direct sunlight.
      - Wash exposed skin/areas with soap and water.
      - Add purification tablets to water.
      - Cook food prior to eating.
  - **After Chemical Attack**. After a chemical attack, MOPP levels may be adjusted as appropriate for the type of hazard and mission. If necessary, soldiers will continue to fight in MOPP4. When time allows, personnel will conduct decontamination to remove field protective masks and reduce MOPP.
    - Personnel will wear field protective masks until receiving the command to unmask.
    - Personnel must reorganize and continue the mission.
    - Casualties will be treated and evacuated.
    - Weapons, equipment, and living areas must be decontaminated as necessary.
    - MOPP gear exchange is conducted as necessary.
    - Continued reassessments are needed of available hazard information and mission requirements to ensure that MOPP levels are not set too high.
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## **MOPP Gear Exchange**

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As an officer you will be responsible for ensuring that your unit can survive and accomplish their mission on the modern battlefield. Once the battlefield becomes contaminated, expect to be in MOPP gear for several hours without relief. To maintain your unit's combat effectiveness, your Marines must be prepared to perform MOPP gear exchange.

Purpose of MOPP Gear Exchange. The purpose of MOPP gear exchange is to:

- Limit the spread of contamination.
- Allow temporary relief from MOPP4.
- Facilitate additional decontamination requirements.

MOPP gear exchange is one half of operational decontamination. Operational decontamination is designed to be performed at squad level, but can be performed at platoon levels. MOPP gear exchange should be performed within 6 hours of contamination to be most effective. The contaminated squad conducts MOPP gear exchange supported by the unit's supply section. The supply section provides decontaminants and new over-garments. After MOPP gear exchange, Marines will be able to move away from their equipment to a contamination free area, and temporarily reduce MOPP levels.

Site Selection Considerations. The contaminated unit chooses, in coordination with higher headquarters, the site where MOPP gear exchange will be performed. The location should be a site where little preparation is required. Generally, the contaminated unit has the most complete knowledge of local conditions and is best qualified to select the site. When selecting a MOPP gear exchange site, it should

- Have good:
  - Overhead concealment.
  - Drainage.
- Be off the main route, but within easy access for vehicles.
- Be large enough area (recommended size is 120 square yards per site) to handle:
  - Vehicle wash down (if performed).
  - MOPP gear exchange for a squad-size element.
- Have a water source. Maximize use of existing facilities, such as car washes, local civilian water sources, etc.

Three Types of MOPP Gear Exchange. The three types of MOPP Gear Exchange procedures that may be performed are:

- Buddy
- Individual (Emergency only)
- Triple Buddy method

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## **MOPP Gear Exchange (Continued)**

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**Buddy MOPP Gear Exchange Procedures.** MOPP gear exchange using the Buddy Method is best managed with squad-sized elements. The personnel in each buddy team alternate as they go through step one. At step two, one member proceeds through step eight before alternating to ensure contamination does not spread onto skin or undergarments.

**CAUTION:** If contamination on the skin occurs during MOPP gear exchange. Stop and decontaminate with your skin decontamination lotion.

<b>Step</b>	<b>Action</b>
<b>1</b>	DECON GEAR: This step removes gross contamination from individual gear (weapon, helmet, load-bearing equipment, and mask carrier).
<b>2</b>	PREPARE FOR DECON: Personnel may perform this step themselves or with the aid of the buddy. This step allows the Marine to remove his over-garment trousers and over-boots later.
<b>3</b>	DECON MASK AND HOOD: This step removes the gross contamination from the mask and the hood.
<b>4</b>	REMOVE OVER-GARMENT AND OVER-BOOTS: This step limits the spread of agents and helps prevent agents from penetrating through to skin or undergarments.
<b>5</b>	REMOVE GLOVES
<b>6</b>	PUT ON OVER-GARMENT
<b>7</b>	PUT ON OVER-BOOTS AND GLOVES
<b>8</b>	SECURE HOOD
<b>9</b>	SECURE GEAR: Put individual gear back on. Put a new chemical protective helmet cover on and move to the assembly area. Use the buddy system to check the fit of all secured gear.

**Individual (Emergency) MOPP Gear Exchange Procedures:** A single Marine may have to exchange MOPP gear when no one can assist; the contaminated Marine may be alone or his buddy wounded or unable to assist. The individual MOPP gear exchange method is used only in extreme emergencies since a risk of transferring contamination from the over-garment to skin or undergarments exists. Follow steps as you would in buddy MOPP gear exchange.

**Site Close Out Procedures:** Although the MOPP gear exchange is done rapidly with little site preparation, the area will be contaminated when the exchange is completed and could be a hazard to friendly forces reoccupying the area.

- All contaminated waste will be placed into a hole and be covered with earth. Mark the area using the standard CBRN contamination markers.
- At a minimum, place the waste in double trash bags. Seal the bags with tape or other material and mark the area.

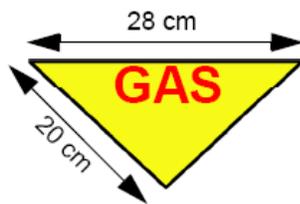
### **NATO CBRN Markers**

There are three standard NATO CBRN markers used to identify a contaminated area. The CBRN marker is a triangle with the standard size of 11.5 inches by 8 inches (28 cm x 20cm). More information about the agent can be found on the back side of the CBRN marker if provided, such as the name of the agent and the date and time of detection.

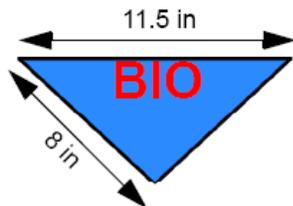
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## **NATO CBRN Markers (continued)**



**Chemical:**  
Yellow background with red lettering



**Biological:**  
Blue background with red lettering



**Radiological:**  
White background with black lettering

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## **Unmasking Procedures**

MOPP4 causes physiological and psychological effects on personnel over extended periods of encapsulation in a contaminated environment. Unmasking procedures will need to be utilized in order to ensure that no contamination is still present in the area. The purpose of unmasking procedures is to alleviate the Marine's encapsulation as quickly as possible. These procedures will be conducted after all methods of agent detection have failed to indicate any agent. The following two unmasking procedures will determine if it is safe to unmask.

Before conducting unmasking procedures, make every effort to confirm the absence of chemical contamination. An M256 chemical-agent detector kit, M8 paper and M9 tape should be used along with a visual check of the area.

**The senior person present selects two or three non-mission essential personnel to unmask after permission is received from higher headquarters.**

1. Conduct unmasking procedures in the following sequence using an M256 detector kit.
    - a. Conduct unmasking procedures in a low lying shady area when possible.
    - b. Use an M256 detector kit to test for vapor chemical agents. Use M8 detector paper to check for possible liquid contamination. Continue unmasking procedures only if both tests are negative.
    - c. Direct selected Marines to unmask for 5 minutes and then don, seal, and clear their masks. If symptoms appear, tell Marines to mask immediately, and then treat them for exposure.
    - d. Observe Marines for 10 minutes for chemical-agent symptoms.
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## Unmasking Procedures (continue)

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- e. Direct all Marines and personnel to unmask if no symptoms appear according to the units SOP.
  - f. Check personnel for delayed symptoms. Have first aid treatment available.
2. Conduct unmasking procedures in the following sequence without using an M256 detector kit.
- a. Conduct unmasking procedures in a low lying shady area when possible.
  - b. Use M8 detector paper to check for possible liquid contamination. Continue unmasking procedures only if the test is negative.
  - c. Direct selected Marines to take a deep breath and break the seals of their masks for 15 seconds (keeping their eyes open), and then seal and clear their masks.
  - d. Observe Marines for 10 minutes for chemical-agent symptoms.
  - e. If no symptoms appear, direct selected Marines to break the seals of their masks and take two or three breaths, and then seal and clear their masks.
  - f. Observe Marines for 10 minutes for chemical-agent symptoms.
  - g. Direct selected Marines to unmask for 5 minutes. If no symptoms appear, direct Marines to don, seal, and clear their masks.
  - h. Observe Marines for 10 minutes for chemical-agent symptoms.
    - (1) If symptoms appear, mask Marines immediately and treat for exposure.
    - (2) If no symptoms appear, direct all Marines and personnel to unmask according to the SOP.
  - i. Check Marines for delayed symptoms. Have first aid treatment available.
3. Report the absence of contamination in the area and the successful completion of unmasking procedures to higher.
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## CBRN-1 Reports

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With the ever-increasing threat of an attack by chemical/ biological agents, CBRN specialists must be prepared to quickly compile and disseminate data concerning such an attack. To aid in this, the CBRN Warning and Reporting System has been developed. Quick action on the battlefield will save lives; therefore you must fully understand the CBRN Warning and Reporting System.

### **CBRN-1 Chemical /Biological Reports**

The CBRN-1 report is the most widely used report. The observing unit uses this report to provide chemical or biological attack data. All units must be completely familiar with the CBRN-1 report format and the information needed to complete the report. This report is prepared at the unit level quickly and accurately and then sent to the next higher HQ.

**Message Precedence:** The initial use of a CBRN-1 report is FLASH precedence; all others are IMMEDIATE precedence.

**Report Preparation.** Individuals identified by the unit SOP submit raw data to the unit CBRN defense team. CBRN-1 format should be used; however, a size, activity, location, unit, time, and equipment (SALUTE) or spot report may also be used and should be submitted to the unit CBRN defense team. The unit CBRN defense team normally consists of individuals who have been trained in CBRN defense. This ensures that the report is in the proper format and is as correct as possible.

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