JCS J-3

Weapons of Mass Destruction (WMD) Handbook

JCS J3
Weapons of Mass Destruction (WMD) Handbook

April 2000

Rather than invading our beaches or launching bombers, adversaries may … deploy compact and relatively cheap weapons of mass destruction—not just nuclear, but also chemical or biological, to use disease as a weapon of war.

President William J. Clinton
May 22, 1998

Table of Contents

Section 1. General Information

1.1 Introduction

The potential use of Weapons of Mass Destruction (WMD) against American citizens and assets is one of the most disturbing threats facing the United States today. Joint Publication 1-02 defines weapons of mass destruction or WMD as "Weapons that are capable of a high order of destruction and/or of being used in such a manner as to destroy large numbers of people." Nuclear, biological and chemical weapons are weapons of mass destruction. For decades, the U.S. has faced the possibility of a WMD attack in a conventional setting. Traditionally, the perceived threat of WMD was directed toward U.S. combat troops or American installations in foreign countries. Today, however, use of WMD against domestic U.S. targets is becoming a more credible threat.

Enhancing this credibility is the fact that WMD threats to the U.S. are no longer restricted to rival nation-states. In this current environment, WMD capabilities are rapidly expanding and becoming more accessible to organized groups or individuals wishing to threaten the United States and its citizens.

Terrorist use of WMD is among the most alarming of emerging transnational threats. Both the absence of other dominating global powers and the existence of overwhelming United States military capability greatly limit a terrorist's options. Increasing numbers of terrorist groups are looking to make use of asymmetric measures to accomplish their goals. "Terrorism" is defined in Joint Pub 1-02 as "The calculated use of unlawful violence or threat of violence to inculcate fear; intended to coerce or to intimidate governments or societies in the pursuit of goals that are generally political, religious, or ideological."

Today, the use of WMD is clearly an emerging threat worldwide. Since Department of Defense personnel, equipment, and facilities at home and abroad are highly visible targets for both terrorist and

conventional attacks, WMD Threat Planning and Response is a high-priority endeavor.

1.2 Purpose

This handbook is designed to be an aid to the staff officer or civilian involved in the defensive planning for, or reaction to the use of weapons of mass destruction. The handbook is divided into four sections – Introduction, WMD Threat Types, U.S. Government Response Capabilities, and Consequence Management. These are followed by appendices containing various information such as terms and definitions, references, points of contact, and websites. The authors' logic was to impart an understanding of the various aspects of the threat and then offer ways of dealing with the threat.

The information contained in this handbook was extracted from relevant Department of Defense and other open-source material. However, it is not an official Department of Defense publication.

1.3 The WMD Threat

DoD must prepare for the full range of WMD threats that installations and facilities face today and in the future. These threats currently include biological, chemical, nuclear and radiological devices, and/or a combination thereof.

Every incident, particularly an act of terrorism, has the potential to be not as it seems and therefore demands first responders' vigilance. The FBI has documented an increase in the use of secondary devices targeting first responders and initial law enforcement officers. As a result, responders should always assume that any suspected situation is a real, fully functional WMD device and treat it accordingly. Only specially trained and equipped explosive ordnance disposal (EOD) military or equivalently trained civilian personnel should approach/handle a suspected WMD device. Extreme caution and a high degree of suspicion are required during the response to any WMD incident. The following section contains a brief overview of each incident category.

Section 2. WMD Threat Types

The United States currently faces a serious potential threat from weapons of mass destruction (WMD). Nations capable of developing and delivering WMD could use these weapons to achieve political or military objectives. WMD could be used as an adjunct to conventional combat power or as a weapon of terror against civilians. The following table provides a summary of the characteristics of WMD.

Figure 1. Characteristics of Weapons of Mass Destruction

Characteristics	Nuclear	Chemical	Biological
area affected	large	relatively small	can be very large
detectability	unmistakable	difficult	very difficult
time to detect & identify	near real time	seconds	tens of minutes
time until onset of effects	varies with dosage	normally minutes	normally days
medical treatment	very limited	limited	can be effective

The fall of the Berlin Wall and the collapse of the Soviet Union have only modified the threat. The threat, which was previously a bi-polar global confrontation between the United States and the Soviet Union and their proxies, now involves a wider range of potential conflicts or other military operations. Such regional challenges heighten the possibility of a confrontation involving a state in possession of WMD. The proliferation of WMD increases the likelihood of their employment in regional conflicts where U.S. or other western interests are involved.

WMD technology is spreading. Developing nations are increasingly coming to possess these weapons or the means to develop them through either overt or covert direct transfer. The potential for their use can range from blackmail or acts of terrorism during peace to employment during conflict or war. The various WMD programs worldwide were largely developed during the 1960s, reached maturity with their battlefield employment during

the 1980s and are undergoing continued expansion. The potential for a deliberate or inadvertent incident or accident, of a chemical or nuclear nature, to occur at an industrial facility or power plant cannot be overlooked. The threat from toxic industrial chemicals (TIC) or low level radiation (LLR) will always present a challenge. A discussion of the nuclear, biological and chemical elements of the threat follows.

2.1 Biological

2.1.1 Characteristics

Joint Publication 1-02 defines biological warfare as the employment of pathogens or toxins to produce casualties in humans or animals and damage to plants or material. There is a distinction is made between pathogens and toxins. Pathogens are living organisms, while toxins are the inert by-products of living organisms. Pathogens are disease producing microorganisms, such as bacteria, viruses, rickettsia, or fungi. They are either naturally occurring, or altered by mutation or genetic engineering. Toxins are poisons produced by the metabolic activities of living organisms. The most common biological agents include anthrax, botulinum toxin, cholera, smallpox, tularemia, Q fever, ricin and plague. Generally speaking, biological agents represent a cheaper and less sophisticated alternative to other WMD.

Biological agents are inherently more toxic then chemical agents on a weight-for-weight basis and can provide broader coverage per pound of payload. Moreover, they are potentially more effective because most are naturally occurring organisms - such as bacteria and viruses - which are self-replicating and have specific physiologically targeted effects, whereas chemical agents are manufactured chemicals that disrupt physiological pathways in a general way. Biological weapons (BW) can be directly or indirectly employed against personnel, plants, animals, or material. Foods, especially uncooked food as in a salad bar, water supplies, or facilities can be rendered unsafe or unfit for use or consumption

through contamination. People can be infected either directly by the employment of a BW agent or indirectly through secondary contamination from an exposed individual.

With all but the spore-forming BW agents such as anthrax, the best and most readily available decontaminating medium is a dilute solution (.5%) of bleach (sodium hypochlorite). This is the solution employed by the USMC Chemical Biological Incident Response Force (CBIRF) for the decontamination of BW victims. Commercially available laundry bleach is also effective. If this is not available, hot, soapy water and sunlight are also effective.

Figure 2. Characteristics of Selected Pathogens

Pathogen	Routes of Infection*	Methods of Dissemination	Untreated Mortality (%)	Incubation Period	Treatment
Anthrax	S,D,R	Aerosol	S - less than 5% R - 100%	1 - 4 days	Antibiotics (limited effectiveness after symptoms develop)
Cholera	D	Covert or Aerosol	50%	1 - 5 days	Antibiotics. Note: Oral rehydration lowers lethality
Plague	V,R	Aerosol or Vectors	Bubonic - 50% Pneumonic - 50-90%	2 - 3 days	Antibiotics
Tularemia	V,S,R	Aerosols	30 - 40%	1 - 10 days	Antibiotics
Q Fever	V,R	Covert or Aerosol	less than 1%	14 - 26 days	Antibiotics
Venezuelan Equine Encephalitis (VEE)	V,R	Aerosol or Vectors	V - 1% R - 25-50%	2 - 5 days	Antibiotics
Viral Hemorrhagic: Fevers (Ebola, Lassa, Rift Valley, Dengue), and Conjunctivitis	DC, uncertain	Aerosol	40-90%	4 - 21 days	Antibiotics

*S - skin, D- digestive, R - respiratory, V - vector, DC - direct contact.
Note 1: No progress has been made in the development of anti-viral vaccines for these pathogens

Figure 3. Characteristics of Selected Toxins

Toxin	Natural Source	Rate of Action	LD50 (MG/KG)	Effect
Cytotoxin				
Microcystin (FDF)	Blue-Green Algae	Rapid	25 - 200	Shivering, stupor, prostration, shock, liver enlargement
Ricin	Castor Bean	Can be delayed or rapid	0.1 - 3.7; 1,000 (oral)	Nausea, vomiting, cramps, bloody nose, diarrhea, difficulty in breathing, twitching
Staphylococcus Enterotoxin Type B (SEB)	Staphylo-coccus aureus bacteria	Can be delayed or rapid	0.023 (aerosol)	Vomiting, cramps, nausea, diarrhea, severe weakness
Tricothecene mycotoxin	Fusarium mold on infected grain	Rapid	500	Itching, tingling, vomiting, hemorrhaging, bloody diarrhea
Mixed Toxin Types				
Snake Venoms/Toxins	Snakes	Rapid	1 - 5,000	Paralysis or hemorrhaging
Cardiotoxins	Cobra, mamba, coral snakes	Rapid	300	Heart irregularities, lower blood pressure
Necrotic toxins	Pit viper	Delayed	1000	Hemorrhage, muscle destruction
Neurotoxins				
Anatoxin A	Blue-green algae	Very rapid	170 - 250	Nerve agent effects, incoordination, tremors, paralysis, respiratory arrest

Figure 3. Characteristics of Selected Toxins (cont.)

Toxin	Natural Source	Rate of Action	LD50 (MG/ KG)	Effect
Batrachotoxin	South American frog	Rapid	0.1 - 2	Loss of coordination, numbness, headache, irregular heart rate, respiratory paralysis
Botulinum	Clostridium botulinum bacteria	Delayed	0.01	Dilated pupils, double vision, dry mouth, paralysis
Palytoxin	Palythoa soft corals	Very rapid	0.45	Muscle contractions, heart irregularities, rigid paralysis
Saxitoxin	Shellfish	Rapid	7 (oral)	Tingling, numbness, weakness, flaccid (limp) paralysis
Scorpion Venom/Toxins	Scorpion	Delayed	300 - 1,200	Irregular, increased heart and breathing; vomiting; excess tears, sweat, and saliva
Tetanus	Clostridium tetani bacteria	Delayed	0.001	Muscle spasms, frequently in the jaw muscles
Tetrodotoxin	Puffer fish	Rapid	30 (oral)	Vomiting; tingling; numbness; lack of muscle control; loss of voice; paralysis, especially of the arms and legs

2.1.2 Methods of Biological Agent Dissemination

There are two methods of dissemination:

- Line source: This technique is most effective using a dispersal means (a truck or air sprayer) moving perpendicular to the wind during an inversion (in which air temperature increases

with altitude, holding surface air and pollutants down; incursions normally occur at dawn, dusk, or night).

- Point source: This technique uses small bomblets deployed in a saturation mode. The saturation technique overcomes the meteorological requirements for line source dissemination. Agents may be introduced into buildings' heating-ventilation-air conditioning systems or via food or water contamination. Small packages or envelopes may also be used to disperse the agent.

Points to Remember:

- Both aerosol attacks and covert attacks have the potential to cause large numbers of casualties.
- Most of the means of protection against a chemical inhalant attack are largely effective against a biological inhalant attack (particularly the mask, although it is not a foolproof protective device). Recognize, however, that awareness that an attack is occurring is key, and this is clearly problematic. Note too that standard military issue NBC filters have been tested only against chemical warfare agents; the military respirator should normally be used only for emergency protection against immediate effects while evacuating from a hazard zone.
- A biological attack may require the treatment of those individuals who were exposed but have not yet exhibited symptoms.

2.1.3 Enemy Capabilities

To a country or terrorist group considering such a course of action, there are advantages to biological weapons over chemical or nuclear weapons. There are few reliable biological detection devices readily available and, biological agents are normally invisible to the human senses. The delay in onset of symptoms could make it difficult to identify the time and place of attack. A biological attack could be attributed to a natural outbreak or

epidemic, thus providing the attacking country with grounds for plausible denial.

Biological agents are a strategic as well as operational threat. They can, depending on their intended use, cause lethal, disabling, contagious or noncontagious types of casualties. Biological agents can be effectively employed against military targets such as headquarters, ship or aircraft crews, and troop concentrations, as well as civilian population centers. Agents could be delivered by missiles, aerosol generators, aerial line sprays or covert means. Such agents, including microorganisms and toxins, are capable of widespread infection and debilitation.

It is estimated that as many as twelve nations are developing biological weapons. Some countries, like Iraq, have disguised their programs as legitimate medical research operations. Biological agent production requires minimal special production equipment and precursor material.

There is little to distinguish a vaccine or pharmaceutical plant from a biological agent facility. Virtually all equipment, technology, and materials needed for biological agent production are dual use. The technical skills required to start and run a program are commensurate with the basic procedures of microbiology, with any required additional knowledge easily gained through training courses available from equipment suppliers or at scientific meetings.

It is not necessary for a country or terrorist organization to maintain large stockpiles of biological weapons as sufficient quantities of agent can be quickly produced using small starter cultures. Iraq has admitted to conducting an offensive biological warfare program, as well as weaponizing botulinum toxin and anthrax. Ricin, T2 mycotoxin and smallpox have also produced with intended targets being Israel and the coalition forces. While Iraqi biological weapon facilities were damaged during the Gulf War, critical production equipment escaped destruction, thus opening the possibility for production to resume in the future.

2.1.4 Mitigation Strategies

The extreme effects of a biological attack can be effectively mitigated. Bleach, hot soapy water, and sunlight are the best, most readily available means of decontamination.

Early detection is the key to mitigation of the effects of a biological attack or incident. Rigorous implementation of the following activities is "best practice" for preventing or detecting biological incidents:

- Water and food inspection programs
- Environmental monitoring programs
- Disease monitoring programs
- Proper physical protection (facilities and PPE)
- Forensic identification means
- Vaccine and diagnostic programs
- Training and awareness programs
- Good intelligence and event notification programs

2.2 Chemical

Joint Publication 1-02 defines a chemical agent as a chemical substance intended for use in military operations to kill, seriously injure, or incapacitate through its physiological effects. Chemical warfare (CW) agents are separated into groups according to the potential severity of their effects: lethal, blister, or incapacitating. Lethal chemical agents are those which primarily cause death among exposed personnel. They include nerve, choking and blood agents. Blister agents damage any tissue which they contact. They could be lethal under certain conditions, but skin, eye, or respiratory damage are their main casualty-producing effects. Blister agents could also be employed to contaminate terrain, facilities, or material. Incapacitating agents are chemicals that cause physiological or mental effects that lead to temporary disability. Unlike riot control agents that have effects lasting only a

few minutes, incapacitating agents produce effects that can last from hours to days.

Chemical agents are classified as non-persistent, as in the case of the G-series of nerve agent, or persistent, as with the nerve agent VX and blister agents. The persistency of a chemical agent refers to the duration of its effectiveness under certain conditions after its dissemination. Generally speaking, persistent agents can present a contact hazard as well as an inhalation hazard. Non-persistent agents present only an inhalation hazard. In order to achieve good ground coverage when dispersed from a high altitude with persistent CW agents, the dispersed droplets must be sufficiently large to ensure that they fall within the target area and do not get transported elsewhere by the wind. This can be achieved by dissolving polymers (e.g., polystyrene or rubber products) in the CW agent to make the product highly viscous or thickened. The result is that the persistence and adhesive ability is increased. This complicates decontamination.

There are military chemical substances that are not considered chemical agents. Incendiary agents such as napalm and phosphorus are not considered chemical agents since they achieve their effect mainly through thermal energy. Certain types of smoke such as HC may be poisonous in extremely high concentrations. But, nonetheless, smoke is not classed as a chemical weapon since the poisonous effect is not the reason for its use. Riot control agents such as CS tear gas are technically classified as chemical compounds and not considered chemical agents.

Various properties of chemical agents are shown in the following chart:

Figure 4. Chemical Agents and Their Effects

Type of Agent	Symbol	Symptoms	Effects	Rate of Action
Nerve	GA GB GD VX	Difficulty breathing, sweating, drooling, convulsions, dimming of vision.	Incapacitates at low concentrations. Kills in sufficient dosage. VX is persistent and a contact hazard. The other agents are non-persistent and present an inhalation hazard.	Very rapid by inhalation, slower through the skin.
Blood	AC CK	Rapid breathing, convulsions, and coma.	Kills in sufficient dosage. Non-persistent and an inhalation hazard.	Rapid
Blister	HD HN HL L	No early symptoms. Searing/stinging of eyes and skin.	Blisters delayed hours to days; eyes and lungs affected more rapidly. Immediate pain, delayed blisters. Persistent and a contact hazard.	Blisters delayed hours to days. Rapid.
Choking	CG DP	Slightly lacrimatory	Damages and floods lungs. Death can result. Non-persistent and an inhalation hazard.	Immediate to 3 hours depending on concentration.
Incapaci-tating	BZ	Rapid heart, vomiting, dry mouth, blurred vision, stupor, random action	Hallucinations, delusions, extreme excitement. Non-persistent and an inhalation hazard.	Delayed; 1 to 4 hrs depending on exposure

2.2.1 Characteristics

Nerve Agents

Nerve agents disrupt the transmission of nerve impulses within the nervous system. Nerve agents belong chemically to the group of organo-phosphorus compounds which includes many pesticides. Nerve agents are stable and easily dispersed, highly toxic and have rapid effects whether they are absorbed through the skin, eyes, or

inhaled. All nerve agents in their pure state are colorless liquids. They can be manufactured by readily available industrial chemical processes. The ingredients, or precursors, of nerve agents, although controlled by international treaties such as the Chemical Weapons Convention (CWC), are obtainable. The most important nerve agents are:

- Tabun, GA
- Sarin, GB
- Soman, GD
- VX

Physical and Chemical Properties

Two primary characteristics of nerve agents is that they are extremely toxic and a very rapid effect. The nerve agent, either as a gas, aerosol or liquid, enters the body through inhalation or through the skin. Poisoning may also occur through consumption of liquids or foods contaminated with nerve agents. The manner in which they enter the body impacts on the time required for the nerve agent to start having an effect. It also influences the symptoms developed and, to some extent, the sequence of the various symptoms. Generally, the poisoning works faster when the agent is absorbed through the respiratory system than via other routes. This is because the lungs contain numerous blood vessels and the inhaled nerve agent can therefore rapidly diffuse into the blood circulation and thus reach the target organs.

Among these organs, the respiratory system is one of the most important. If a person is exposed to a high concentration of nerve agent, death may occur within a matter of minutes. Poisoning takes longer when the nerve agent is absorbed through the skin. Nerve agents are fat-soluble and can penetrate the outer layers of the skin. However, it takes some time before the poison reaches the deeper blood vessels. Consequently, the first symptoms do not occur until 20-30 minutes after the initial exposure but the poisoning process may be rapid if the total dose of nerve agent is high. The toxic effect of nerve agents depends on it binding to the enzyme,

acetylcholinesterase, and thereby inhibiting the enzyme's normal function in the cholinergic nervous system.

Symptoms

When exposed to a low dose of nerve agent causing minor poisoning, characteristic symptoms include increased production of saliva, a running nose and a feeling of pressure on the chest. The pupil of the eye becomes contracted (miosis) which impairs night-vision. The accommodation capacity of the eye is also reduced so that short-range vision deteriorates and the victim feels pain when he tries to focus on an object nearby. This is accompanied by headache. More unspecific symptoms are tiredness, slurred speech, hallucinations and nausea.

Exposure to a higher dose leads to a more dramatic development and symptoms are more pronounced. Bronchoconstriction and secretion of mucous in the respiratory system leads to difficulty in breathing and to coughing. Discomfort in the gastrointestinal tract may develop into cramp and vomiting. Involuntary discharge of urine and defecation may also form part of the picture. The discharge of saliva is powerful and the victim may experience running eyes and sweating. Symptoms from the skeletal muscles are very typical. If the poisoning is moderate, this may express itself as muscular weakness, local tremors or convulsions.

When exposed to a high dose of nerve agent, the muscular symptoms are more pronounced. The victim may suffer convulsions and lose consciousness. To some extent, the poisoning process may be so rapid that earlier mentioned symptoms may never have time to develop. Muscular paralysis caused by nerve agents also affects the respiratory muscles. Nerve agents also affect the respiratory center of the central nervous system. The combination of these two effects is the direct cause of death. Consequently, death caused by nerve agents is a kind of death by suffocation.

The toxic effect depends on both the concentration of nerve agent in the air inhaled (C) and the time of exposure (t). In extremely

high concentrations there is a simple relationship, C t, which gives a certain toxic effect. Inhalation of sarin vapors with a concentration of 100 mg/m^3 for one minute gives the same result as inhalation of 50 mg/m^3 for two minutes. However, at low concentrations this relationship does not apply since the human body is capable of some degree of detoxification. In order to obtain a corresponding effect, it is then necessary to have relatively longer periods of exposure.

Antidotes and Methods of Treatment

As was previously stated, nerve agents are extremely rapid acting. If medical treatment is to have a beneficial effect, it must be started immediately. Auto-injector containing antidotes to nerve agents are the commonly encountered form of treatment. One of the component in the auto-injector is atropine. Atropine is the classical antidote in cases of poisoning by organo-phosphorus compounds. It is a medication which relieves the symptoms but does not attack the cause of the injury. Atropine becomes bound to the receptors for acetylcholine, which are present in the cholinergic synapse. When acetylcholine is bound, the signal is transmitted but if atropine has become bound to the receptor, then no such transmission takes place. Atropine thus gives protection against the excess of acetylcholine which results from inhibition of acetylcholinesterase. Atropine has effects only within certain parts of the cholinergic nervous system.

An additional auto-injector can be given to victims of nerve agents if their situation does not improve within ten minutes. Subsequently, the victim should be treated by qualified medical staff who should initially inject additional atropine and an anti-convulsant drug such as diazepam. In cases of severe poisoning by nerve agents, large doses of atropine (grams) may be required. The level of operational acetylcholinesterase is gradually restored by the body's own production but this process requires at least two weeks. During this period, and possibly also later, the victim may require medical care not only for mental disorders such as difficulty in sleeping, amnesia, difficulties in concentrating, and anxiety, but

also for muscular weakness. Mental problems may also occur after long exposure to extremely low concentrations to nerve agents.

There are also medical antidotes which can be taken preventively. These antidotes are normally taken in tablet form. One of the tablets, pyridostigmine, contains a carbamate, as active ingredient. Pyridostigmine inhibits acetylcholinesterase and protects the enzyme against inhibitory effects of nerve agents. The dose is low and leads to about 25 percent inhibition. The pyridostigmine-inhibited enzyme is continuously released to active state and thereby can reasonably effectively maintain the transfer of nerve impulses despite injury caused by nerve agents. The effect is restricted to the peripheral cholinergic nervous system since the substance does not enter the brain.

Pretreatment with carbamate should be combined with oxime therapy (the auto-injector) after the poisoning in order to provide maximum effect. This combination reduces the toxic effects of all nerve agents. A diazepam tablet is also generally given as a pretreatment, primarily affecting the central nervous system. Diazepam strengthens the effect of other nerve agent antidotes. There will be better prospects of survival and less injury. Diazepam also provides protection against permanent brain damage which may result from heavy exposure to nerve agents.

Pretreatment has best effect if a warning system is available and operative, since the tablets need about 30 min. to have effect after being swallowed. The best protective effect is achieved after about two hours, which is followed by decreasing efficacy. If the situation so requires, treatment can be repeated at eight-hourly intervals for some days. The tablets should not be taken once nerve agent injury has occurred. Admittedly, diazepam has a positive effect but pyridostigmine at that stage will aggravate the injury.

Blood Agents

Most blood agents are non-persistent CW agents which are primarily absorbed into the body by breathing. These agents can be dispersed by artillery, mortar, rocket, aircraft spray, or bomb. There

are two primary blood agents—hydrogen cyanide (AC) and cyanongen chloride (CK). It has been reported that hydrogen cyanide was used by Iraq in the war against Iran and against the Kurds in northern Iraq during the 1980s. Hydrogen cyanide has high toxicity and in sufficient concentrations it rapidly leads to death. During the Second World War, a form of hydrogen cyanide (Zyklon B) was used in the Nazi gas chambers. At room temperature, hydrogen cyanide is a colorless liquid.

Both gaseous and liquid hydrogen cyanide can also enter the body through the skin. Its high volatility probably makes hydrogen cyanide difficult to use in warfare since there are problems in achieving sufficiently high concentrations outdoors. On the other hand, the concentration of hydrogen cyanide may rapidly reach lethal levels if it is released in confined spaces.

Symptoms of cyanide poisoning vary and depend on, for example, route of poisoning, total dose and the exposure time. If hydrogen cyanide has been inhaled, the initial symptoms are restlessness and increased respiratory rate. Other early symptoms are giddiness, headache, palpitations and respiratory difficulty. These are later followed by vomiting, convulsions, respiratory failure and unconsciousness. If the poisoning occurs rapidly, e.g., as a result of extremely high concentrations in the air, there is no time for symptoms to develop and exposed persons may then suddenly collapse and die. Today, there is no medical antidote against cyanide poisoning within the U.S. Armed Forces. The treatment given to victims is based on encouraging and speeding-up the body's own ability to excrete cyanide and to bind cyanide in the blood.

Blister Agents

Blister agents received their name due to the similarity of the wounds they caused to burns and blisters. However, since blister agents (also called “vesicants”) also cause severe damage to the eyes, respiratory system and internal organs, they could also be described as tissue-injuring agents. The effect of blister agents are

delayed and the first symptoms do not occurring until 2 to 24 hours after exposure. The severity of a blister agent burn is directly related to the concentration of agent and duration of its contact with the skin. Blister agents can also be used to contaminate supplies or facilities. These agents are persistent and may be employed as a gas or liquid. Blister agents are divided into three types: mustards, arsenicals, and urticants.

Mustard Agent

Mustard agent was first used as a CW agent during the latter part of the First World War and caused lung and eye injuries to a very large number of soldiers. Many of them still suffered pain 30-40 years after they had been exposed, mainly as a result of injuries to the eyes and chronic respiratory disorders.

During the war between Iran and Iraq in 1979-88, Iraq used large quantities of chemical agents. Approximately 5 000 Iranian soldiers have been reported killed, 10 to 20 percent by mustard agent. In addition, there were from 40,000 to 50,000 injured. A result of warfare with mustard agent is that the medical system is loaded with numerous injured requiring long-term care.

Physical and Chemical Properties

In its pure state, mustard agent is colorless and almost odorless. The name "mustard" was given to the blister agent "H" as a result of an earlier production method which yielded an impure mustard-smelling product. Mustard agent is also claimed to have a characteristic smell similar to rotten onions. However, the sense of smell is dulled after only a few breaths so that the smell can no longer be distinguished. In addition, mustard agent can cause injury to the respiratory system in concentrations that are so low that the human sense of smell cannot distinguish them.

Mustard agent can easily be dissolved in most organic solvents but has negligible solubility in water. In aqueous solutions, mustard agent decomposes into non-poisonous products by means of hydrolysis. This reaction is catalyzed by alkali. However, only

dissolved mustard agent reacts, which means that the decomposition proceeds very slowly. Bleaching powder and chloramines, however, react violently with mustard agent, whereupon non-poisonous oxidation products are formed. Consequently, these substances are used for the decontamination of mustard agent.

Symptoms

Whether in a gas or a liquid, mustard agent attacks the skin, eyes, lungs and gastro-intestinal tract. Internal organs may also be injured, as a result of agent being absorbed through the skin or lungs and transported into the body. Delayed effects are a characteristic of mustard agent. Mustard agent gives no immediate symptoms upon contact and consequently a delay of between two and twenty-four hours may occur before pain is felt and the victim becomes aware of what has happened. By then cell damage has already been caused.

Symptoms of mustard agent poisoning extend over a wide range. Mild injuries consist of aching eyes with abundant flow of tears, inflammation of the skin, irritation of the mucous membrane, hoarseness, coughing and sneezing. Normally, these injuries do not require medical treatment. Severe injuries which are incapacitating and require medical care may involve eye injuries with loss of sight, the formation of blisters on the skin, nausea, vomiting and diarrhea together with severe respiration difficulty.

The number of deaths due to exposure to mustard agent is low as compared to other CW agents. The inhalation dose of mustard agent required to directly kill a person is approximately 50 times larger than the inhalation dose required to kill a person with the nerve agent soman. People who die after exposure to mustard agent usually do so after a few days up to one or more weeks.

Minor skin damage may be caused by mustard agent in the gaseous state whereas the most severe injuries are caused after contact with liquid mustard agent. Skin damage first appears as a painful inflammation. Depending on the level of exposure, the injury may

develop into pigmentation, which flakes-off after a couple of weeks, small surface blisters or deep liquid-filled blisters with subsequent skin necrosis. In extreme cases, the skin necrosis may be so comprehensive that no blisters occur. Skin injuries are more severe in humid and warm climates. Similarly, the injuries will be more severe where the skin is moist and warm, e.g., in the groin and armpits.

Experience has shown that even extremely extensive skin damage, 80 to 90%, can be cured if the patient is kept free of infection. However, injuries to the skin require a very long period of recuperation, much longer than thermal burns, and may require care and plastic surgery over a period of several months.

Injury to the eyes appears initially as irritation with eye inflammation and a strong flow of tears. Depending on exposure, the symptoms thereafter may successively develop to sensitivity to light, swollen eyelids, and injury to the cornea. Severe damage to the eye may lead to the total loss of vision. Victims suffering damage to the eyes may encounter problems persisting up to 30 to 40 years following exposure. The most common cause of death as a result of mustard agent poisoning is complications after lung injury caused by inhalation of mustard agent. Lung injuries become apparent some hours after exposure and will first appear as a pressure across the chest, sneezing and hoarseness.

Severe coughing and respiration difficulties caused by pulmonary edema will gradually occur and after a couple of days, a "chemical pneumonia" may develop. Most of the chronic and late effects are also caused by lung injuries.

The effect on inner organs which is most pronounced is injury to the bone marrow, spleen and lymphatic tissue. This may cause a drastic reduction in the number of white blood cells 5-10 days after exposure, a condition very similar to that after exposure to radiation. This reduction of the immune defense will complicate the already large risk of infection in people with severe skin and lung injuries.

Antidotes and Methods of Treatment

There is no treatment or antidote that can affect the basic cause of mustard agent injury. Instead, efforts must be made to treat the symptoms. By far the most important measure is to rapidly and thoroughly decontaminate the patient and thereby prevent further exposure. This decontamination will also decrease the risk of exposure to staff. Clothes are removed, the skin is decontaminated with a suitable decontaminant and washed with soap and water. If hair is suspected to be contaminated, then it must be shaved off. Eyes are rinsed with water or a physiological salt solution for at least five minutes.

In medical treatment, efforts are made to control infections by means of antibiotics. Pain can be eased by local anesthetics. After skin injuries have healed, it may be necessary to introduce plastic surgery. Lung injuries are treated with bronchodilatory treatment. Medicine to relieve coughing and also cortisone preparations may be used. Eye injuries are treated locally with painkillers and with antibiotics if required. Despite treatment, inflammation and light sensitivity may remain for long periods.

Arsenicals

The arsenicals are a group of blister agents having arsenic as a central atom in their chemical structure. Arsenicals produce much the same injuries to the skin and mucus membrane as mustard, but have the added effect of being a systemic poison. Arsenicals are colorless to brown liquids that evaporate more quickly than mustard and have a fruity or geranium-like odor. They are much more dangerous as liquids than as vapors. Immediate decontamination to remove liquid agent is necessary in contaminated individuals, but is not necessary for exposure to vapors unless pain is present. Sneezing and irritation to the upper respiratory tract can result from exposure to the vapors. There are three main arsenicals: lewisite (L), mustard-lewisite mixture (HL), and phenyldichloroarisine (PD).

Urticants

Urticants are blister agents that cause an immediate, severe burning sensation followed by intense pain and then a feeling of numbness. The most important of the urticants is phosgene oxime (CX). It has a disagreeable, penetrating odor and can appear as a colorless crystalline solid, or as a liquid. CX causes violent irritation to the mucous membrane of the eyes and nose. An individual exposed to CX will first show an area of pale skin surrounded by a red ring where the agent came in contact with the skin. A wheal resembling a bee sting will form within 30 minutes. The area will turn brown within 24 hours, and a scab will form within a week. Healing could be delayed for as long as two months. Any skin exposed to CX should be decontaminated as soon as possible by flushing the area with large amounts of water.

Choking Agents

Choking Agents are lethal chemical agents that are designed to cause death in an exposed individual. These agents injure unprotected personnel mainly in the respiratory tract (nose, throat, and lungs). These agents will "choke" an unprotected person. Upon exposure, membranes swell and secrete fluid, the lungs fill with this fluid, and death results from lack of oxygen. The term for such a death is "dryland drowning." There are two choking agents: Phosgene (CG) and diphosgene (DP). CG is a chemical agent with short agent-cloud duration. It was used extensively during World War I. An estimated 80% of World War I chemical fatalities resulted from CG. CG is a colorless gas with an odor similar to new-mown hay, grass or green corn. It tends to hug the ground and linger for extended period of time in trenches and low areas.

Diphosgene (DP) is also a colorless gas with an odor similar to CG. DP has a stronger tearing effect than CG and thus has less of a surprise value when used against personnel. Its symptoms and effects are similar to CG.

Incapacitating Agents

This group of agents includes substances which, when administered in low doses cause conditions similar to psychotic disorders or other symptoms emanating from the central nervous system (loss of feeling, paralysis, rigidity, etc.). The effects are transitory and cause inability to make decisions and incapacitation. During the 1950's, studies were made of substances such as glycolic acid esters (glycolates). Particular interest was paid to 3-quinuclidiny lbenzilate, BZ. The effects of BZ are similar to those caused by atropine. BZ causes poisoning at doses of 0.5-5 mg. Peripheral symptoms such as distended pupils, deteriorated short-distance vision, dry mouth and palpitations occur after about 30 minutes.

A serious effect of poisoning with BZ, as also with other atropine-like substances, is an increased body temperature. Deterioration in the level of consciousness, hallucinations and coma occur subsequently. Incapacitating after-effects may remain 1-3 weeks after the poisoning.

2.2.2 Methods of Dissemination

Mortars, howitzers, bombs, spray tanks, rockets and missiles can be used to deliver chemical agents. Terrorists could employ chemical weapons in a covert manner as was done by the Aum Shinrikyo cult. In the dispersal of CW agents, a mixture of liquid droplets and gas is generated. The weather, terrain, and buildings will all have an effect on the chemical agent once it has been employed.

Influence of Weather

An attack with chemical weapons always causes injuries to unprotected people who are in or close to the target area. Strong wind, heavy rain or temperatures below freezing may reduce effects. After the attack, the weather will be of great importance for the respiratory risks expected at different distances from the target. Similarly, weather conditions influence the effect of ground contamination. After an attack, the primary cloud will drift with the wind. Wind velocity will be decisive for how long it will take for

the primary cloud to pass the given place. High wind velocity implies a short time of passage and thus fewer injuries to unprotected persons, whereas low wind velocity will lead to more injuries. Consequently, a weak wind may cause effects at greater distances than strong winds.

Wind velocity also naturally influences how fast the primary cloud moves. If the wind is gentle, then there are better opportunities to provide warning in time. In very weak winds, however, the gas cloud will not move very far. In addition, the wind direction varies widely in such situations which is why a circular area must be alerted in an attack with CW agents. The concentration in the primary cloud may also decrease in cold weather and particularly if the temperature is lower than freezing. This depends on a smaller amount of CW agents evaporating during dispersal that also implies that the share of ground contamination will be greater.

Precipitation also reduces the concentration since some of the gas/aerosol is "washed" away by wet deposition. A major problem during the winter may be that contaminated snow on shoes and clothes is taken into shelters, vehicles or buildings. Once in the warmth, the CW agent will evaporate and may cause concentrations of gas. Light rain will cause ground contamination to be more dangerous since the pores in the soil become clogged and prevent the substance from penetrating down into the soil. Heavy rain, however, will flush off ground contamination whereas heavy snow will cover it. In both cases, the contact risk is decreased.

Terrain and Buildings

Woodland and undulating terrain give shorter danger distances for the primary cloud since the wind will be exposed to greater turbulence. Woodland also adsorbs a certain amount of gas and aerosol through dry deposition. In or close to the target area, however, woodland, depressions, pits and narrow streets may lengthen the effect of an attack. Gas and aerosol will be retained in these areas, particularly in situations of weak wind and stable

stratification. The longest danger distances are obtained if the cloud passes over plains or lakes, or follows the contours of a valley.

The effect of a passing cloud of gas/aerosol will be delayed inside tents, buildings and vehicles. Owing to the lower air exchange in such places, it will take longer for the cloud to penetrate. A certain amount of the CW agent will be taken up and bound on walls and other surfaces, which also contributes to decreases in concentration. Consequently, it may be expected that there is a certain reduction in the effect of a passing cloud of gas. In ordinary buildings, the protection can be improved by closing doors and windows, turning off the ventilation and sealing all cracks with tape.

It will, thus, take longer for the cloud of gas to penetrate a house, for example. For the same reason, the gas will remain longer indoors when the rest of the cloud has passed by. Consequently, it is of the greatest importance to obtain information on when it is possible to start airing the building again.

Ground configuration is also of importance for the contact risk in ground contamination. A dry, hard but porous surface, e.g., asphalt or concrete, will lead to fewer contact risks. On soft ground, e.g., grass, moss, sand or snow, it is easier to come into contact with CW agents that have penetrated the underlying surface. In dense woodland, the ground contamination is reduced and becomes uneven since the falling droplets are caught to some extent in the crowns of the trees. Terrain covered by bushes, on the other hand, may lead to major risks of contact.

2.2.3 Enemy Capabilities

Chemical weapons present a plausible choice for many nations or terrorist organizations because even countries or groups lacking the technology or the resources to build nuclear weapons can produce chemical weapons. Chemical munitions require little more expense or expertise to manufacture than conventional munitions and the technology and literature necessary for their manufacture are available on the world market. In the past 40 years, combatants have used chemical weapons in Yemen (1963 to 1967), in Laos and

Cambodia (late 1970s), in Afghanistan (mid-1980s), in the Iran-Iraq War (1983 to 1988), and during the on-going war in the Sudan. The Japanese cult Aum Shinrikyo employed the nerve agent sarin in Matsumoto (1994) and in the Tokyo subway system (1995).

2.3 Nuclear

2.3.1 Characteristics

The principle effects of nuclear weapons are blast, thermal radiation (heat), nuclear radiation and electromagnetic pulse (EMP). These effects are dependant on the size or yield of the weapon as expressed in kilotons, the physical design of the weapon, and the method of deployment.

The altitude at which the weapon is detonated will largely determine its effects. The classification of nuclear explosions is highlighted below:

- Airburst—The weapon is detonated below 30km and the fireball does not contact the surface of the earth. While initial radiation will be significant, fallout hazard can be ignored. Fission products will be dispersed over a large area of the globe. At ground zero there may be a small area of neutron-induced activity.
- Surface Burst—The weapon is detonated on or slightly above the surface so that the fireball actually contacts the earth. The area affected by the blast, thermal radiation, and initial nuclear radiation will be lees extensive than for an airburst, except at ground zero, where the destruction is concentrated. Local fallout hazard can extend over a large down-wind area.
- Subsurface Burst—Detonated beneath land or water. Cratering will generally result. If the burst does not penetrate the surface, the only hazard will be from ground or water shock. If the blast is shallow enough to penetrate the surface, effects will be present, but less than for a surface burst of similar yield. Local fallout will be heavy.

High Altitude Burst—Detonated an altitude above 30 km that initial soft x-rays generated by the detonation dissipate energy as heat in a much large volume of air molecules. As a result, the fireball is much larger and expands much more rapidly. Significant ionization of the upper atmosphere leads to a disruption of communication and can lead to the generation of Electromagnetic Pulse (EMP).

Figure 5. Nuclear Weapon Effects

Effect	Percentage of Nuclear Burst Energy	Products
Blast	50%	Shockwave
Thermal radiation	35%	Heat, fire, burns
Residual radiation	10%	Fallout, neutron induced gamma activity
Initial radiation	4%	Causalities
Electromagnetic pulse (EMP)	1%	Electronic interference

Any of these bursts will result in four types of ionizing radiation: neutron, gamma, beta, and alpha. Neutron and gamma radiation are present in the initial burst, while alpha, beta, and gamma rays comprise the residual radiation.

Electromagnetic pulse (EMP) is the high-energy, short duration pulse (similar in some aspects to a bolt of lightning) generated by a nuclear explosion. EMP can produce a current in any electrical conductor and temporarily disrupt or damage components not properly protected. Devices affected include radios, computers, telephones, and other circuitry. Both EMP and transient radiation effects on electronic (TREE) must be taken into consideration in any situation involving the threat of nuclear weapons.

2.3.2 Methods of Dissemination

A nuclear incident can be triggered by any device designed to produce a nuclear yield. The device may be a military-grade nuclear weapon, or an Improvised Nuclear Device (IND). A nuclear device utilizes the fission of nuclear material (U-235, Pu239, etc.) to create blast and thermal effects, and prompt exposure to gamma and neutron radiation. The fallout is composed of non-fissioned nuclear material, fission products and activation products. These materials contaminate very large regions downwind from the area impacted by the prompt weapon effects. Fallout creates very high external exposure hazards from beta and gamma radiation, and internal exposure hazards from inhalation or ingestion of the fallout.

2.3.3 Enemy Capabilities

In addition to the seven declared nuclear states (U.S., France, Russia, UK, India, Pakistan, and China), as many as five other states may have nuclear weapons. Most undeclared nuclear-capable states might possess a few, low-yield weapons. Nuclear weapon employment doctrine of undeclared countries is less defined than that of the former Soviets and their criterion for use is less predictable.

Tactical employment of a nuclear weapon by an adversary would likely be directed against key military objectives such as air and naval bases, and critical centers of gravity. Subsequently, enemy doctrine envisions large-scale conventional forces in "nuclear dispersed" formations striking deeply into friendly defenses, passing through nuclear-created gaps to destroy friendly command, control, communications, computers and intelligence (C4I) facilities and other critical targets. Once within the friendly operational area, the threat objective would attempt to split, isolate and destroy friendly forces. The effects of nuclear weapons pose unprecedented physical and psychological problems for combat forces and civilian populations alike.

2.3.4 Mitigation

As with any strike by a hostile nation, the potential of a nuclear attack could be reduced through preemptive negotiations, the threat of retaliation, or the use of air defense and ABM defensive systems to intercept an incoming weapon or its carrier. Terrorist attacks can be deterred through implementation of an AT/FP plan, strong counterterrorist /counterintelligence operations OCONUS, and the use of Random Antiterrorism Measures.

Planning should focus on treatment for both blast effects and radiation. Blast and thermal injuries may outnumber radiation injuries in many cases. However, radiation effects are considerably more complex and varied.

The first action when dealing with casualties is to treat any conventional injuries. Triage should then be performed to prevent infection and stabilize patients. Antiemetics should be used to reduce symptoms of gastrointestinal distress. Additional treatment will be needed to aggressively resuscitate bone marrow and manage microbial infections. All surgery should be completed with in 36-48 hours of irradiation.

2.4 Radiological

2.4.1 Agent Characteristics

Radiological hazards are presented by exposure to alpha, beta and gamma particles. Unlike a nuclear weapon, a radiological weapon does not release radioactivity in a massive burst of energy. Rather, it mimics a toxic chemical in which the cumulative dose of radiation eventually proves harmful or fatal.

Radioactive materials can include those commonly found in nuclear plants (iodine, tritium, and cesium), industrial sources (cobalt, cesium, uranium and plutonium), and medical sources (phosphorus, thallium, X-rays, and sodium).

2.4.2 Methods of Dissemination

A radiological dispersion device uses any mechanism to distribute radioactive materials over a given area. Means of dispersal can include chemical explosives, aerosol sprays or hand distribution. The hazard posed is dependent on the type of radioactive material, i.e., what radionuclides are involved, its chemical and physical form, and the nature of the dispersion mechanism. Hazards can include external exposure to beta/gamma radiation, gamma radiation alone, or internal exposure from alpha, beta or gamma emitting radionuclides that are ingested or inhaled.

The advantage of radiological weapons is that nuclear technology is not required to create them. Anyone with access to radioactive materials can build a radiological weapon. Radioactive contaminants can be delivered by a variety of means including human agent, missile, aircraft, artillery, or the destruction of a facility containing radioactive materials.

A hostile nation would most likely incorporate radiological materials in a conventional weapons system. A terrorist could either incorporate readily available radiological materials into an explosive device or use a large explosive to damage a radiological site such as a nuclear power plant. It is often difficult to determine that a radioactive material is involved, so the necessary detection equipment (typically through HAZMAT teams) should be put to use at all explosive incident sites.

2.4.3 Enemy Capabilities

Radiological weapons are primary used to induce terror or to deny access to a given area. Because of the time required to accumulate a disabling dose of radiation through ingestion, inhalation or exposure, radiological weapons have limited utility except as an obstacle. Their primary value is the psychological effect on both civilians and military personnel. These weapons by also produce the desired affect of diverting resources toward decontamination.

Potential sources for RDWs include hospital radiation therapy, nuclear power fuel rods, and universities or laboratories. Unclassified sources reveal that both the Iraqis and Russian Separatists in Chechnya have already demonstrated a practical knowledge of these weapons. The availability of materials needed for RDWs will inevitably increase in the future as more countries pursue nuclear power programs. Generally speaking, any nation or terrorist organization that has access to radiological materials can create a radiological dispersion device.

2.4.4 Mitigation Strategies

As with any strike by a hostile nation, the potential of a radiological attack could be reduced through preemptive negotiations, the threat of retaliation, or the use of air defense or ABM defensive systems to intercept an incoming weapon or its carrier.

Terrorist attacks can be deterred through implementation of an AT/FP plan, strong counterterrorist/counterintelligence operations OCONUS, and the use of Random Antiterrorism Measures. Specifically at risk, however, are those installations or facilities that possess an organic radiological capability that terrorists may seek to destroy or disable with a conventional device.

In the event that an attack occurs, shielding personnel from the radiation source can reduce or minimize exposure. A brief discussion of the appropriate shielding techniques for the various radiological particles follows:

- Alpha Shielding—Heavily charged particles with very low airborne range. They can be stopped with a sheet of paper or at the skin. Problems arise however when external exposure leads to internal contamination.
- Beta Shielding—While airborne beta particles can travel significant distances, they are easily stopped by solid materials. A sheet of aluminum will easily stop beta emissions. Eye-protection should be worn in a beta particle environment.

- Gamma Shielding—Gamma radiation is highly penetrable and could present an external hazard. Successfully shielding Gamma ray photons is determined by absorber thickness and density. As the thickness of the absorber increases the gamma radiation will decrease. Lead, tungsten, concrete and steel can be used as shielding from gamma emissions.

Personnel decontamination is readily accomplished. A high level (90-95%) of decontamination can be achieved by simply removing outerwear and shoes. The remaining decontamination is accomplished by washing the patient's skin, hair and scalp.

2.5 Modeling and Downwind Hazard Prediction Programs

Hazard Prediction and Assessment Capability (HPAC). HPAC is a suite of fast running computer tools and supporting infrastructure developed by the U.S. Defense Threat Reduction Agency (DTRA). HPAC is designed to predict the generation, transport, dispersion and effects of nuclear, chemical, biological and radiological (NCBR) hazards. HPAC is capable of handling the full spectrum of NCBR threats to include:

- Nuclear weapons strikes and on WMD facilities
- Conventional strikes on nuclear facilities
- Chemical and biological weapons
- Conventional strikes on chemical, biological and hazardous industrial facilities

Additionally, HPAC can predict casualties (prompt and otherwise) for nuclear weapons as well as performance degradation that accompany the employment of a chemical or biological agent.

Consequences Assessment Tool Set (CATS). CATS was developed by the U.S. Defense Threat Reduction Agency (DTRA) and is an integrated package of hazard prediction, consequence assessment and emergency management tools, including HPAC, operating within a commercial Geographical Information System (GIS). CATS:

- Predicts hazards caused by NBC attacks
- Predicts collateral damage to industrial targets
- Assesses associated casualties and damage to facilities, resources, and infrastructure. This includes deaths, injuries, and displacement.
- Creates mitigation strategies for strategic force support.

This page left intentionally blank.

Section 3. USG Response Capabilities

3.1 Equipment by Type

3.1.1 Detection

Name: ***M31 Biological Integrated Detection System (BIDS)***
Threat: ***Biological***
Specifications:

- Vehicle-mounted, fully integrated biological detection system
- Modular to allow component replacement and exploitation of "leap ahead" technologies
- Capable of detecting and presumptively identifying four BW agents simultaneously in less than 45 minutes
- DOD's first credible, rapidly deployable biological detection capability
- Corps level asset, however there are only two BIDS units within the DoD Inventory.
- Total processing time, from insertion of sample to data readout, will be approximately 15 minutes at threshold concentrations
- Includes an operator display which will provide identification and relative concentration of the biological agent detected

Name: ***Interim Biological Agent Detector (IBAD)***
Threat: ***Biological***
Specifications:

- Provides shipboard detection of biological warfare agents
- Capable of detecting an increase in the particulate background,
- Which may indicate a man-made biological attack is underway, and sampling the air for identification analysis
- Detects a change in background within 15 minutes, and can identify biological agents within an additional 30 minutes

Name: ***Portal Shield ACTD Residuals***
Threat: Biological
Specifications:

- Interim capability for biological detection at high value fixed overseas sites such as air bases and ports
- Uses an innovative network of sensors to increase probability of detecting a BW attack while decreasing false alarms and consumables
- System can detect and identify up to eight BW agents simultaneously in less than 25 minutes
- Successfully deployed overseas in support of Operation Desert Thunder, and was also successfully operated during the NATO 50th anniversary

Name: ***Long Range Biological Stand-off Detector System (LRBSDS)***
Threat: ***Biological***
Specifications:

- Can detect, range, and track particulate clouds that are indicative of a BW attack
- Cannot discriminate biological from non-biological clouds
- System is mounted on a UH 60 Black Hawk helicopter for operations
- NDI system is able to detect and track man-made aerosols out to 30 km, but is non-eye safe out to about 2.5 km
- P3I will provide an eye safe laser system at all ranges, an automated cloud detection and tracking capability, and an increased detection range (50 km)
- This system will give the CINCs a tremendous BW defensive capability

Name: ***Chemical Agent Monitor (CAM) and Improved Chemical Agent Monitor (ICAM)***
Threat: ***Chemical***
Specifications:

- CAM is a hand held instrument capable of detecting, identifying, and providing relative vapor hazard read-outs for G and V type nerve agents and H type blister agents
- Detects and identifies agents within one minute of agent exposure
- ICAM is 300% more reliable, starts up 10 times faster, and the modular design is much less expensive to repair.
- ICAM may be used for a variety of missions, to include area reconnaissance and area surveillance, monitoring of decontamination operations, and medical triage operations
- This device would be issued to the individual detection and monitoring teams.

Name: ***M256A1 Chemical Agent Detector Kit***
Threat: ***Chemical***
Specifications:

- Can detect and identify field concentrations of nerve agents, blister agents, and blood agents in both vapor and liquid form in about 15–20 minutes
- Ticket has pretreated test spots and glass ampoules containing chemical reagents
- Presence or absence of chemical agents is indicated through specific color changes on the test spots
- Used to determine when it is safe to unmask, to locate and identify chemical hazards and to monitor decontamination effectiveness
- This device would be issued to the individual detection and monitoring teams.

Name: ***ABC-M8 VGH, and M9 Chemical Agent Detector Paper***
Threat: ***Chemical***
Specifications:

- M8 and M9 paper are dye impregnated papers that change color when exposed to liquid chemical agents or aerosols
- Cannot detect chemical agents in vapor form
- M8 paper is capable of detecting G series nerve agents (sarin, tabun, soman, and GF), V type nerve agents, and H (mustard) type blister agents
- Typically used to identify unknown liquid droplets during chemical reconnaissance/ surveillance missions
- M9 paper is typically placed on the BDO, equipment, and vehicle exteriors to warn personnel of the presence of a liquid chemical agent
- Issued to the individual

Name: ***M18A2 Chemical Agent Detector Kit***
Threat: ***Chemical***
Specifications:

- Can detect and identify dangerous concentrations of nerve agents, blister agents, blood agents and choking agents in about 1–4 minutes

  Used by special teams such as surety teams, EOD, and technical escort personnel

Name: ***AN/KAS-1/1A Chemical Warfare Directional Detector (CWDD)***
Threat: ***Chemical***
Specifications:

- Semi-portable system designed to detect nerve agent vapor clouds at ranges up to five kilometers
- Operator must manually aim the detector at the suspect cloud and interpret its infrared images to determine whether or not the cloud contains nerve agent vapors

Name: ***M21 Remote Sensing Chemical Agent Alarm (RSCAAL)***
Threat: ***Chemical***
Specifications:

- Automatic scanning, passive infrared sensor that detects nerve (GA, GB, and GD) and blister (H and L) agent vapor clouds
- Effective at line-of-sight distances of up to five kilometers
- Alarm is used for surveillance and reconnaissance missions in both vehicle-mounted and tripod-mounted modes

Name: ***AN/PDR-75 Radiac Set***
Threat: ***Nuclear and Radiological***
Specifications:

- Provides the capability to monitor and record the exposure of individual personnel to gamma and neutron radiation.
- Issued at the company level and the dosimeters are issued to all combat, combat support, and combat service support personnel.

Name: ***AN/PDR-77 Radiac Set***
Threat: ***Nuclear and Radiological***
Specifications:

- Portable radiation detection equipment for detecting alpha, beta, gamma, and x-ray radiation
- Entire set is contained in a carrying case (large brief-case) for easy portability and storage
- Issued at the company level and the dosimeters are issued to all combat, combat support, and combat service support personnel.

Name: ***AN/UDR-13 Pocket RADIAC***
Threat: ***Nuclear and Radiological***
Specifications:

- Compact, hand-held, tactical device capable of measuring the gamma dose-rate and gamma and neutron cumulative dose in a battlefield environment
- Pocket size permits convenient use by troops on foot

- Alarm pre-sets provided for both the dose-rate and total dose modes

Name: ***ADM-300A Multifunction Survey Meter***
Threat: ***Nuclear and Radiological***
Specifications:

- Used alone to locate and measure low and high intensity radioactivity in the form of gamma rays or beta particles
- Used with external probes to locate and measure alpha, beta, gamma, and x-rays, and neutron radiation
- Reader is issued at the company level and the dosimeters are issued to all combat, combat support, and combat service support personnel

3.1.2 Protection

3.1.2.1 Individual Protective Equipment (IPE)

Masks:
Name: ***MCU-2A/P Protective Mask***
Threat: ***NBC***
Specifications:

- Provides eye and respiratory protection from all chemical and biological agents as well as radioactive particulate material
- Uses a replaceable, standard NATO filter canister that is mounted on either side of a wide-view optical quality visor
- Provides improved fit, comfort, and visibility relative to earlier masks, and includes a drinking tube for attachment to the standard canteen, and electronic voicemitter connections for improved communications
- Issued to the individual

Name: ***M40/42 Series Protective Mask***
Threat: ***NBC***
Specifications:

- Provide eye-respiratory face protection from tactical concentrations of CB warfare agents, toxins and radioactive fallout particles
- Consists of a silicone rubber face piece with an in-turned peripheral face seal and binocular rigid lens system
- Face piece is covered with a chlorobutyl/EPDM second skin to provide optimum liquid agent protection for the masks
- Accommodates NATO standard canisters, which can be worn on either cheek of the mask
- The M40 series is designed for the individual dismounted ground warrior, while the M42 series is designed for combat vehicle crewmen;
- Recent improvements include a universal second skin, making the mask compatible with JSLIST and Saratoga over garments, and ballistic/laser protective eye lens outserts

Name***: M45 Aircrew Protective Mask (ACPM*****)**
Threat: ***CB***
Specifications:

- Specially designed to meet the requirements of helicopter and special crews
- Does not require power or forced air to provide CB protection; it provides compatibility with helicopter optical systems, aircraft displays and night vision devices
- Close fitting eye lenses mounted in a silicone rubber face piece with an in-turned peripheral seal, a detachable hood system, and utilizes the standard NATO canister

Name: ***M48 Protective Mask – Production***
Threat: ***CB***
Specifications:

- Third generation M43 series masks

- Only mask for the Apache aviator for the foreseeable future
- Consist of a lightweight motor blower, a new hose assembly, a web belt, the mask carrier, face piece carrier, eye lens cushions, and the face piece of the M43A1

Name: ***Aircrew Eye/Respiratory Protection (AERP)***
Threat: ***CB***
Specifications:

- Protective mask that enables aircrews to conduct mission operations in a chemical-biological environment
- Includes a protective hood assembly with a standard MBU-12/P mask, an intercom for ground communication, and a blower assembly that provides de-misting
- Stowed during flight operations on a bracket that is mounted inside the aircraft

Name: ***CB Respiratory System (A/P22P-14(V) 1, 2, 3, & 4) NDI***
Threat: ***CB***
Specifications:

- Self-contained protective ensemble designed for all forward deployed rotary wing and fixed wing aircrew
- Incorporates a CB filter, dual air/oxygen supply and a cross-over manifold with ground flight selector switch to provide filtered air for hood ventilation, and filtered air for oxygen for breathing
- Provides enhanced protection and offer anti-drown features

Protective Overgarments:
Name: ***Battle Dress Overgarment (BDO)***
Threat: ***NBC***
Specifications:

- Camouflage patterned (desert or woodland), two piece, air permeable overgarment typically worn over the duty uniform
- Overgarment material consists of an outer layer of nylon cotton, and an inner layer of activated charcoal impregnated polyurethane foam

- Provides protection against chemical agent vapors and liquid droplets, biological agents (to include toxins), and radioactive alpha and beta particles
- Issued in a sealed vapor-barrier bag that protects the garment from rain, moisture and sunlight
- Provides 24 hours of chemical agent protection once contaminated and has a field durability of 22 days (extendable to 30 days at the discretion of Field Commanders)

Name: ***JSLIST Overgarment***
Threat: ***NBC***
Specifications:

- Provide 24-hour protection after 45 days of wear and 6 launderings
- Liner based upon activated carbon bead technology, replacing the bulky activated carbon foam technology in previous garments
- Two-piece jacket and trouser design with an integrated hood compatible with respective Service masks and second skins
- Worn as an overgarment for the duty uniform or as a primary garment over underwear depending upon the environment and mission

Name: ***CP Suit, Saratoga (USMC)***
Threat: ***NBC***
Specifications:

- Air permeable, camouflage patterned overgarment
- Uses spherical, activated carbon adsorbers immobilized in the liner fabric
- Allows for a lighter, cooler garment, which is launderable
- Provides a 24-hour protection period and has a durability of 30 days continuous wear

Name*:* *CWU-66/P Aircrew Ensemble*
Threat: ***NBC***
Specifications:

- One-piece flightsuit configuration
- Provides 24-hour protection against standard NATO threats
- Made with Von Blucher carbon spheres—less bulky than prior ensembles
- Offers a reduced thermal load burden and is compatible with aircrew life support equipment

Name: ***Chemical Protective Undergarment (CPU)***
Threat: ***NBC***
Specifications:

- Two-piece lightweight undergarment made of a non-woven fabric containing activated charcoal
- Worn under the combat vehicle crewmen (CVC) coverall or battle dress uniform (BDU)
- Provides 12 hours of protection and is durable for 15 days

SPECIALTY SUITS
Name: ***Joint Firefighter Integrated Response Ensemble (JFIRE)***
Threat: ***CB***
Specifications:

- Joint effort between the Air Force (lead agency) and the Army
- Ensemble will protect the military firefighters IAW National Fire Protection Associated (NFPA) standards and provide CB protection during firefighting operations in a CB environment
- Meets several key requirements, including (1) providing 24 hours of CB agent protection against 10 g/m2 liquid agent, (2) providing firefighters CB protection in both structural and crash fire fighting/rescue operation, (3) allowing firefighters to use mission essential tools and equipment in a CB environment, (4) providing resistance to water and all standard fire fighting chemicals (foam, CO_2, aircraft POL), and (5) is capable of being donned in 8 minutes

Name: ***Suit Contamination Avoidance Liquid Protection (SCALP)***
Threat: ***Chemical***
Specifications:

- Worn over standard chemical protective garments to provide 1 hour of protection from gross liquid contamination
- Consists of a jacket with hood, trouser and booties
- Made from a polyethylene-coated Tyvek™ material

Name: ***Interim-Self Contained Toxic Environment Protective Outfit (STEPO-I)***
Threat: ***Chemical***
Specifications:

- Interim system for 2-hour depot operations in Immediate Danger to Life and Health (IDLH) environments
- Consists of encapsulating suit made of butyl rubber-coated nylon with a polycarbonate visor
- Respiratory protection provided by one of two options—tethered clean air supply or a self-contained rebreather worn as a back-pack
- Cooling is provided by an ice vest worn underneath the suit

Name: ***Self-Contained Toxic Environment Protective Outfit (STEPO)***
Threat: ***CB***
Specifications:

- Provides OSHA level A protection for Army Chemical Activity/Depot (CA/D), Explosive Ordnance Disposal (EOD) and Technical Escort Unit (TEU) personnel
- Totally encapsulating protective ensemble for protection against chemical and biological agents, missile/rocket fuels, POL, and industrial chemicals for periods up to four hours
- Incorporates two types of NIOSH approved self-contained breathing systems, a tether/emergency breathing apparatus option, a battery powered Personal Ice Cooling System

(PICS), a hands-free communications system, and standard Toxicological Agent Protective (TAP) boots and gloves

- Capable of being decontaminated for reuse up to 5 times after chemical vapor exposures
- Shares common, modular components with the ITAP and JFIRE ensembles

Name: ***Improved Toxicological Agent Protective (ITAP)***
Threat: ***Chemical***
Specifications:

- Enhances existing capabilities by increasing personal protection and reducing the thermal burden on the wearer
- Provides skin and respiratory protection both during peacetime and wartime for short term operations in Immediately Dangerous to Life and Health (IDLH) toxic chemical environments (up to 1 hr), emergency life saving response, routine Chemical Activity operations and initial entry and monitoring
- ITAP shares common, modular components with the STEPO and JFIRE ensembles
- Suit and overhood are capable of being decontaminated for a minimum of 5 reuses, 2 hours per use (1 hour at IDLH), after vapor and particulate contamination
- After liquid contamination ITAP suit will be decontaminated and held for disposal
- Capable of being stored within the temperature range of 0° to 120°F and has a minimum shelf life of 5 years

PROTECTIVE ACCESSORIES

Name: ***Green Vinyl Overboots /Black Vinyl Overboots (GVO/BVO)***

Threat: ***Chemical***

Specifications:

- Fitted vinyl overshoes worn over the combat boots to provide chemical agent protection and/or moisture vapor protection during wet weather
- Provides protection against chemical agents for 12 hours and are durable for up to 14 days

Name: ***Multipurpose Overboot (MULO) (JSLIST Boots)***

Threat: ***Chemical***

Specifications:

- Joint service program under the auspices of the JSLIST program
- Designed for wear over the combat boot, jungle boot, and intermediate cold/wet boot
- Provides durability, improved traction, resistance to POLs and flame, and better donning and doffing characteristics over standard footwear

Name: ***Chemical Protective (CP) Gloves***

Threat: ***Chemical***

Specifications:

- Consists of a butyl-rubber outer glove for protection from chemical agents, and a cotton inner glove for perspiration absorption
- CP outer gloves come in three levels of thickness: 7, 14, and 25 mil
- 7 mil glove is used by personnel who require a high degree of tactility, such as medical and personnel engaged in electronic equipment repair; should be replaced within 6 hours of exposure to a chemical agent

- 14 mil glove is used by personnel like aviators and mechanics, in cases when good tactility is necessary and stress to the glove is not too harsh; provide protection for at least 24 hours
- 25 mil glove is used by personnel who require a durable glove to perform close combat tasks and heavy labor; provide protection for at least 24 hours

3.1.2.2 Collective Protection

Name: ***M20/ M20A1 Simplified Collective Protective Equipment***
Threat: ***NBC***
Specifications:

- Converts an interior room of an existing structure into a positive overpressure, NBC collective protection shelter where individuals can perform assigned missions without wearing the protective mask and overgarment
- Consists of a liner, protective entrance, filter canister, and support kit
- Low cost method of transforming a room in an existing structure into an NBC collective protection shelter for command, control and communication (C 3), medical treatment, and soldier relief functions
- M20A1 is a room liner for existing shelters
- Normally issued for employment at the tactical, small unit level

Name*: M28 Simplified CPE (SCPE)*
Threat: ***NBC***
Specifications:

- Low cost method of transforming a room of an existing structure into an NBC collective protection shelter for command, control and communication (C3), medical treatment, and soldier relief functions
- Components include a CB vapor resistant polyethylene liner that provides a protected area in an existing structure; a collapsible, protective entrance that allows entry to/exit from

the protected area; a hermetically sealed filter canister, which provides filtered air to both the liner and the protective entrance; and a support kit, which contains ducting, lighting, sealing and repair material and an electronically powered blower

- Normally issued for employment at the tactical, small unit level

Name: ***Chemically Protected Deployable Medical System (CP DEPMEDS)***
Threat: ***CB***
Specifications:

- Joint Army/ Air Force effort to insert environmentally controlled collective protection into currently fielded hospital shelters
- Sustains medical operation for 72 hours in a chemical contaminated environment
- Chemically protected through the addition of a CB kit
- Sustains approximately 500 patients and staff, chemically protected latrines and water distribution systems have been developed

Name***: Chemically/Biologically Hardened Air Transportable Hospital (CHATH)***
Threat: ***CB***
Specifications:

- Joint Air Force/ Army effort to enable medical personnel to deploy and setup in chemical and biological threat areas and operate in chemically and biologically active environments
- Allows personnel to perform their hospital duties in a Toxic Free Area
- Can be operated from standard electrical sources or from its own internal generator
- Equipped with an Automatic Transfer Switch (ATS) to maintain power after Base power is shut off; starts the Diesel generator after three seconds of power interruption

- Deployed in increments of 10, 25, and 50 beds

Name: CB Protected Shelter (CBPS)
Threat: *CB*
Specifications:

- Highly mobile, rapidly deployable shelter system designed to be used for Echelon I and II forward area medical treatment facilities
- The system is self-contained and self-sustaining
- Operational within 20 minutes with a crew of four
- The system is environmentally conditioned by a hydraulically powered environmental support system, which provides filtered air, heating, air conditioning, and electrical power

Name: *Portable Collective Protection System*
Threat: *CB*
Specifications:

- Permits mobility and flexibility in chemically or biologically contaminated areas
- Can be erected by four Marines within 30 minutes wearing MOPP 4 gear
- Divided into a main area and two smaller compartments; the entry area, and the storage area
- When overpressure is applied, the protective shelter provides protection from liquid and vapor chemical and biological agent
- An airlock (protective entrance) allows purging of possible chemical agent vapors and additional decontamination of personnel entering the main area

3.1.3 Decontamination

Name: ***M291 Skin Decontamination Kit***
Threat: ***CB***
Specifications:

- Consists of a wallet-like flexible carrying pouch containing six individually sealed foil packets
- Enables warfighters to remove, neutralize, and destroy chemical and biological warfare agents on contaminated skin
- Issued to the individual and carried in a pocket of the Battle Dress Overgarment (BDO)

Name: ***M295 Equipment Decontamination Kit***
Threat: ***CB***
Specifications:

- Consists of a pouch containing four individual wipedown mitts, each enclosed in a soft, protective packet
- Issued to the individual and designed to fit comfortably within the pocket of a BDO
- Enables the warfighter to perform basic decontamination to remove, neutralize, or destroy CB warfare agents and toxins on contaminated personal and load bearing equipment

Name: ***ABC-M11 Portable Decontaminating Apparatus***
Threat: ***CB***
Specifications:

- Used to spray DS2 decontaminating solution onto critical areas *(i.e.*, frequently used parts) of vehicles and crew served weapons
- Produces a spray 6 to 8 feet long, and covers an area of about 135 square feet
- Issued for use on tanks, vehicles and other compact systems

Name: ***M13 Decontaminating Apparatus, Portable (DAP)***
Threat: ***CB***
Specifications:

- Man portable

- Consists of a vehicle mounting bracket, a pre-filled fluid container containing decontaminating solution, and a brush-tipped pumping handle connected to the fluid container by a hose
- Decontaminates 1,200 square feet per fluid container
- Allows personnel to decontaminate hard to reach surfaces, and remove thickened agent, mud, grease and other material

Name: ***M17 Series Lightweight Decontamination Apparatus***
Threat: ***CB***
Specifications:

- Portable, lightweight, compact engine driven pump and water heating system
- Used during decontamination operations
- Capable of drawing water from any source and delivering it at moderate pressure and controlled temperatures

Name: ***M21/M22 Modular Decontamination System (MDS)***
Threat: ***CB***
Specifications:

- Provides the warfighter an improved capability to perform detailed equipment decontamination on the battlefield
- Improves effectiveness, reduces water usage, reduces equipment processing time, and is less labor intensive than traditional mop and broom decon
- Capable of drawing water from natural and urban water sources (such as fire hydrants) and delivering it at variable and adjustable pressures, temperatures and flow rates

3.2 Specialized Response Teams

3.2.1 DoD Assets

Nuclear/Radiological

52d Ordnance Group (EOD) (Contact information appears in Appendix C)

***Mission*:** Provide military explosive ordnance disposal units to defeat or mitigate the hazards from conventional, nuclear, or chemical military munitions and weapons of mass destruction throughout CONUS as requested by local, state, federal law enforcement or military authorities.

***Capability*:** The capabilities of the 52nd EOD are multifaceted to include:

- Identification and render safe of foreign and U.S. military munitions (chemical, conventional and nuclear)
- Disposal of munitions encountered
- Response and render safe of terrorist improvised explosive devices (IED) (i.e., pipe bombs, booby traps)
- Response for WMD incidents
- Conduct training in military munitions and IED to law enforcement agencies
- Provide continuous support to the U.S. Secret Service and State Department for VIP Protection details

Each unit has a variety of bomb disposal tools and detailed classified procedures for handling U.S., foreign, and terrorist munitions. Included in their equipment are robots for remote operations, special cannons and explosive shape charges, and a variety of EOD tool sets for specific munitions.

Existing agreements with the Army Technical Escort Unit (TEU) outline interoperational support between the 52d Group and TEU for missions involving non-stockpile U.S. chemical munitions and terrorist WMD devices with chemical or biological fillers. Agreements between the DoD and DOE outline roles for the 52d

Group for responding to a U.S. or foreign nuclear military weapon incident or to a terrorist WMD with nuclear or radiological components.

The 52nd EOD has four Ordnance Battalions with thirty-seven companies stationed throughout CONUS. Often there are between 2-5 companies deployed OCONUS at any one time; the CONUS local areas affected are then supported by the next nearest EOD unit until the end of the deployment.

***Deployment*:**
Personnel: 2 EOD soldier team up to the full 22-soldier Company.

Time requirements: All EOD response teams can be dispatched within ½ hour (duty hours) and 1 hour (non-duty hours). The designated SIED Companies are capable of dispatching a full unit capability within 4 hours for WMD operations (depart home station within 4 hours).

Location: Total of 37 Ordnance Companies (EOD) stationed throughout CONUS. The four designated SIED Companies are located at:

749th EOD Co. is at Andrew AFB, MD

766th EOD Co. is at Cape Canaveral AFS, FL

797th EOD Co. is at Ft Sam Houston, TX

710th EOD Co. is at the Naval Submarine Base, San Diego, CA

Madigan Army Medical Center

Disaster Assistance Response Team (DART) (Contact information appears in Appendix C)

***Mission*:** To provide a rapid deployment unit with triage, ambulatory/ litter and advanced medical/ trauma stabilization capabilities for the U.S. Army needs related to NBC incidents in the western United States.

***Capability*:** The DART capabilities include triage, decontamination, and stabilization of contaminated/ multiple

injured casualties. DART serves as the medical augmentation team for Umatilla (Army Chemical Depot), where they conduct quarterly training. The team has 24-hour access to a board certified toxicologist. DART has received training in Medical Management of Chemical Casualties and Medical Effects of Nuclear Weapons. Team members have received substantial training in basic/advanced life support, trauma life support, HAZMAT, confined space medicine, crush injury medicine and emergency medical response to terrorism. They also participate in CSEPP exercises at chemical depots, NDMS exercises, national/local conferences concerning the Emergency response to terrorism, combined training with Puget Sound USAR, and the Summit of the Eight in Denver.

DECON capabilities: The DART operates at the transition line/hot line (Warm Zone) not in the Hot Zone. They set up 3 Western habitat tents, similar to the DMATS, dedicated to Litter decontamination, Ambulatory decontamination and Emergency Medical stabilization/staging. The Ambulatory decontamination tent has 2 showers and is divided in the middle to segregate men and women. DART can decontaminate 2 non-ambulatory victims in 10 minutes and 2 ambulatory victims in 5 minutes. DART can commence ambulatory and litter decontamination within less than 30 minutes of arriving on scene.

The DART is composed of personnel from the MAMC with an Army Captain OIC. The DART consists of EM physicians, 4 RNs, 6 LPNs, 7 Medics, and 2 lab Techs/Medics. Augmentation with additional board certified Emergency Medicine physicians as well as Nuclear Science personnel is available to meet mission needs.

***Deployment*:**
***Equipment*:** 4 tons of equipment tailored to IPE (Civilian levels B, C, Military MOPP), chemical decontamination/ detection, delivery of high acuity medical care. Comprehensive pharmaceutical cache, state of the art environmental shelters. (Entire packing list can be provided upon request).

Personnel: The DART is composed of 20 personnel with an Army Captain OIC.

Time requirements: The DART is on-call status 24-hours a day 7 days a week and can be ready to deploy ("wheels up") within two hours with an 8-hour response time in the western U.S..

Location: DART personnel are located at Madigan Army Medical Center on Ft Lewis, WA. Personnel and equipment can deploy via aircraft from McChord Air Force Base or Gray Army Airfield.

Response Task Force East (RTF-E) (Contact information appears in Appendix C)

***Mission*:** When directed, First U.S. Army activates and deploys Response Task Force-East (RTF-E) to support the Lead Federal Agency during a Weapons of Mass Destruction (WMD) incident. Commander, RTF-E assumes operational control of all committed Department of Defense elements (less JSOTF), coordinates military support of crisis and consequence management operations and redeploys when Department of Defense disengagement criteria are met.

***Capability*:** Establishes a fully functional RTF-E Command Post in the vicinity of the incident within 24 hours of notification. Exercises operational control of all federal Department of Defense resources committed to providing military support to civil authorities (MSCA). Provides liaison officers to appropriate civil agencies and receives liaison officers from appropriate military commands and agencies. Performs the functions of a Joint Task Force-Consequence Management (JTF-CM).

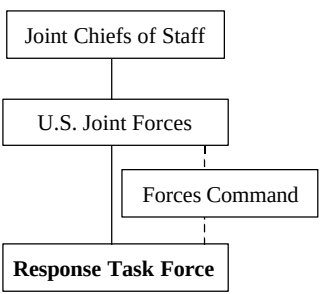
The RTF-E is composed of members of the First Army HQ, both military and civilian from Ft Meade, MD and Ft Gillem, GA. The initial response team establishes initial liaison with the supported civil agencies and coordinates support for the follow-on personnel. The predesignated Defense Coordinating Officer (DCO) and Defense Coordinating Element (DCE) serve as special staff augmenting the RTF-E with additional personnel when established. Within 24 hours, RTF-E deploys the main body and establishes a

command post capable of conducting 24-hour operations for command and control of federal Department of Defense elements (less JSOTF) supporting civil authorities.

The RTF-E can also deploy all organic personnel at one time. Typical technical operations support resources under the operational control of RTF-E include elements of the U.S. Army Chemical-Biological Rapid Response Team (C-B RRT), Technical Escort Unit (TEU), 52d Ordnance Group (Explosive Ordnance Disposal), and the U.S. Marine Corps Chemical-Biological Incident Response Force (CBIRF).

***Deployment*:**
Personnel: 80 personnel (Includes 26 personnel from the DCE)
Time requirements:
Representative Cell: Enroute NLT N+4;2 personnel
Advance Element: Enroute NLT N+12; 27 personnel
(5 from Fort Meade, MD and 22 from Fort Gillem, GA)
Main Body: Fully operational NLT N+24
Location: Ft Meade, MD and Ft Gillem, GA

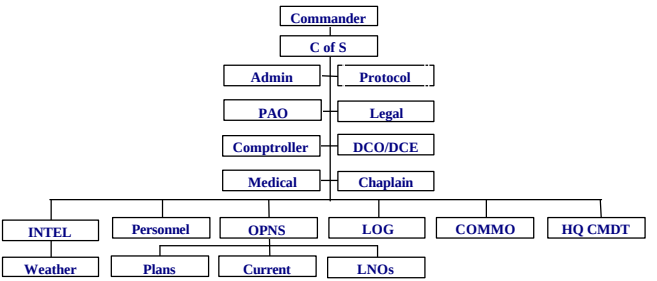
Response Task Force – West (RTF-W) (Contact information appears in Appendix C)



***Mission*:** When directed, Fifth Army deploys RTF-W to support the Lead Federal Agency (LFA) during a Weapons of Mass Destruction (WMD) incident in USACOM's area of responsibility;

assumes OPCON of committed DoD elements and redeploys upon meeting DoD support termination criteria.

***Capability*:** RTF-W provides effective command and control of on-site DoD assets involved in crisis or consequence management during a WMD event. It also provides planning and coordination for the deployment and employment of additional DoD assets. Provides liaison to key local, state, and federal agencies to include, but not limited to, the FBI, FEMA, DOE, and the EPA.



RTF-W is composed of members of the Fifth Army HQ staff, both military and civilian. Its organization reflects that of a traditional staff with additional emphasis placed on enhanced liaison capabilities required to effectively coordinate with DoD and non-DoD organizations involved in WMD incidents. Typically, organizations such as SBCCOM, CBIRF, and a variety of logistical support organizations will be subordinate to RTF-W.

Deployment:
***Equipment*:** 1 Communications Van, 4 15 PAX Vans
***Personnel*:** 105 personnel
***Time Requirements*:**
Representative Cell: Enroute NLT N+4 hours 4 personnel
Advance Element: Enroute NLT N+12 hours.....35 personnel
Main Body: Fully operational NLT N+24 hours
***Location*:** Ft Sam Houston, TX

Armed Forces Radiobiology Research Institute (AFRRI). This is DOD's sole laboratory for conducting biomedical research to address military medical operational requirements for dealing with the prompt and delayed effects of radiation exposure. AFRRI is currently assigned to the Uniformed Services University of the Health Sciences.

Air Force Radiation Assessment Team (AFRAT). A deployable team of health physicists, technicians and equipment, AFRAT provides bioenvironmental support, radioisotope analysis, radiation protection, and consulting support. Located at Brooks AFB, TX, AFRAT is deployable within 5 hours.

U.S. Army Radiological Advisory Medical Team (RAMT). Specially trained in radiological health matters, this team can provide assistance and guidance to the on-scene CRTF and local medical authorities. The team is located at Walter Reed Army Hospital, Washington, DC.

U.S. Army Radiological Control (RADCON) Team. This team is organized to provide radiological monitoring support and advice to the CRTF. The team is capable of deploying within several hours from Ft. Monmouth, NJ.

CHEMICAL

Army Materiel Command (AMC) Treaty Laboratory, SBCCOM (Contact information appears in Appendix C)

***Mission*:** Support the multilateral Chemical Weapons Convention, the Bilateral Destruction Agreement, and the Wyoming Memorandum of Understanding. All of these treaties include provisions for sampling and analysis to verify compliance.

***Capability*:** The AMC Treaty Laboratory provides an on-site analytical laboratory capability. The lab is capable of analyzing chemical surety materials, foreign chemical warfare agents, and all precursors and degradation by-products. The lab maintains an analytical spectra database that provides the capability for analyzing other hazardous industrial chemicals. The lab is

comprised of a series of transportable modules, which contain analytical instruments such as GC/flame photometric/mass selective detectors, fume hood, and all supporting equipment such as electrical generators for short-term power requirements.

***Deployment*:**

***Equipment*:** Depending on the mission equipment weight will vary from 1-3 tons.

Personnel: The lab is accompanied by up to five personnel that include: one Ph.D. chemist, two chemists, and two sampling technicians.

Time requirements: The AMC Treaty Lab can be ready to deploy from home base within four hours of notification.

Location: Edgewood Area of Aberdeen Proving Ground, MD.

United States Marine Corps Chemical Biological Incident Response Force (CBIRF) (Contact information appears in Appendix C)

***Mission*:** Provide a highly-trained, rapid response force capable of providing consequence management (threat identification, casualty extraction, personnel decontamination and medical triage/ treatment/stabilization) for terrorist initiated chemical and biological attacks in order to mitigate the effects of multiple/mass casualty incidents.

***Capability*:** As a consequence management response force, the CBIRF is tailored for short notice response to chemical/biological incidents. The CBIRF also maintains an information "reach-back" capability to a cadre of CB matter and disaster response experts for consulting purposes.

The CBIRF provides a self-contained response in six areas:

- Command (headquarters)
- Chemical and biological detection/identification and decontamination
- Medical
- Security
- Service support
- Explosive Ordnance Disposal

The CBIRF is structured in two parts, the Rapid Response Force and a follow-on force. The Rapid Response Force, comprised of

120 Marines and Navy personnel, is capable of providing initial incident assessment and limited consequence management. The follow-on force is comprised of 230 Marines and Navy personnel.

The CBIRF, comprised of both the Rapid Response Force and the follow-on force, has the capability, in accordance with established procedures, to process 200 non-ambulatory chemical and trauma patients within six to eight hours, or approximately 100 to 150 ambulatory patients per hour for a total of 500 patients. These quantities and rates are highly dependent on the incident circumstances such as, but not limited to agent(s) encountered, water availability and amount and severity of trauma encountered. For pre-planned events, the goal is to be able to acquire sufficient medical supplies to process 1,500 casualties.

The Rapid Response Force can be tailored to the threat/mission, however it deploys with part of the total CBIRF capability (as shown below):

1. External and internal communications
2. Protective equipment
3. Detection and identification equipment
4. Personal decontamination equipment
5. Medical treatment
6. Mobil laboratory
7. Casualty airway protection

The remaining consequence management equipment is transported with the follow-on force. The Rapid Response Force service support element provides contracting support and is capable of procuring logistical support from government and non-government sources within the local community near the affected site.

***Deployment*:**

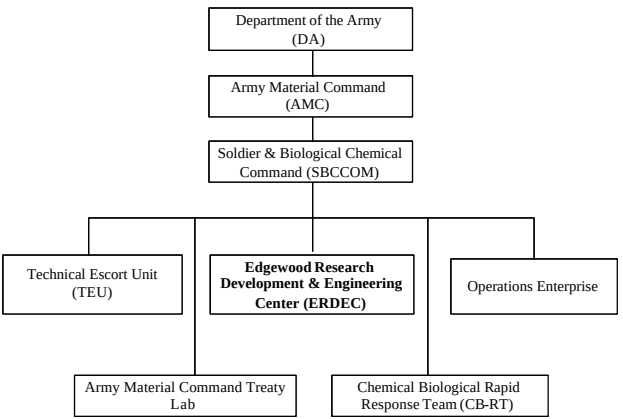
***Equipment*:** It takes the equivalent of 2 C-17 aircraft to airlift the CBIRF

Personnel: Rapid Response Force is comprised of 120 Marines and Navy personnel. Follow-on force is comprised of 230 Marines and Navy personnel.

Time requirements: The CBIRF Rapid Response Force maintains a 24-hour, on-call status and has a goal of being deployed, ("wheels-up"), within 4 hours with prior indication and warning and provided an aircraft is available. CBIRF follow-on force can be ready to deploy within 18 to 24 hours of notification.

Location: The CBIRF is located at Camp Lejeune, NC, and has access to air transport at Cherry Point, NC.

Edgewood Research Development and Engineering Center (ERDEC) (Contact information appears in Appendix C)



***Mission*:** Chemical Support Division (CSC). To serve as the ERDEC point of contact for operations associated with chemical surety materiel (CSM)-related remediation and restoration at the Edgewood Area of Aberdeen Proving Ground, MD and formerly used defense sites. The CSD also manages and maintains support services and capabilities associated with material, facilities, and equipment vital to ERDEC's mission. The CSD provides technical

and program management support to DOD and other Government agencies associated with the processing of chemical facilities, equipment, and ammunition.

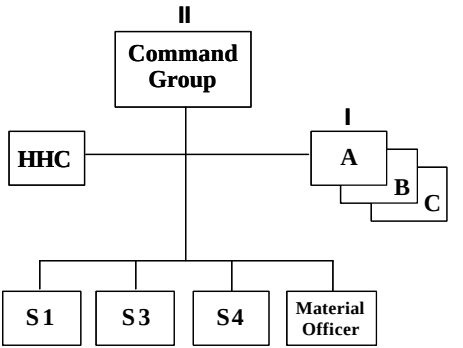
***Capability*:** The CSD has the capability to provide a full range of CSM-related air, water, and soil analysis in support of ERDEC, DOD and other Government agency operations and remediation efforts. The CSD also provides and maintains a repository of chemical agent standard analytical reference materials in support of the DOD chemical defense mission.

The CSD possesses the capability to provide low level monitoring using the Real Time Analytical Platform (RTAP), a vehicle containing a fully functional chemical analysis system. In its current configuration, the RTAP can automatically sample ambient air to detect the presence of specific chemical warfare agents (nerve and mustard agents). The analysis process allows for the detection of GB, GD, VX, and HD in the same sample.

The CSD also has available the Mobile Environmental Analytical Platform (MEAP) which provides accurate and legally defendable determinations of chemical warfare material, expressly CSM, agent degradation products, World War I chemical warfare agents, and other compounds of military significance in environmental samples.

***Deployment*:**
Time requirements: The RTAP and operators can be ready to deploy in 4 hours after initial notification.
Location: Aberdeen Proving Ground, MD

U.S. Army Technical Escort Unit (TEU) (Contact information appears in Appendix C)



***Mission*:** Provide worldwide, no-notice capability to conduct field sampling, identification and verification; monitoring, recovery, decontamination, escort and mitigation of hazards associated with chemical and biological materials in compliance with international, federal, state, and local laws.

***Capability*:** The capabilities of the TEU are multifaceted to include:

- Technical escort of C/B agents material, and munitions
- Render safe and/or dispose of weaponized C/B munitions and material
- Conduct technical intelligence exploitation of foreign C/B munitions and material
- Provide C/B response team to government agencies as required to support National/International Counterproliferation Policy

TEU's basic operational element is the Chemical-Biological Response Team (CBRT). The unit can deploy CBRTs from Aberdeen Proving Ground, MD, Dugway Proving Ground, UT and Pine Bluff Arsenal, AR. In general, each CBRT is comprised of 12 chemical/biological and explosives ordnance disposal specialists,

but the team composition can be tailored to the mission. The CBRT can be deployed to suspect or actual incidents involving chemical/biological agents, munitions, and other hazardous materials. The TEU's CBRTs maintains a rapid response capability in detection, decontamination (neutralization), containment (packaging), dismantlement (render safe), and disposal (transport and escort only) of weapons of mass destruction containing chemical/biological agents or related materials.

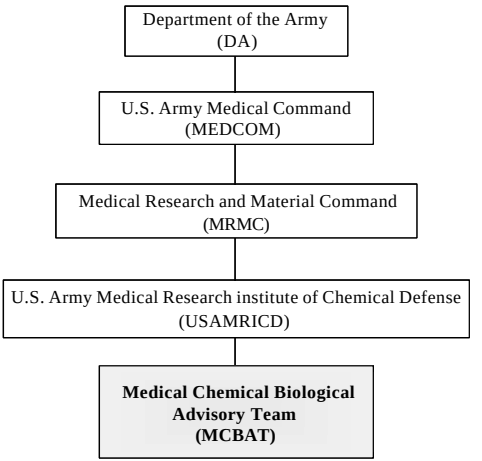
The CBRT also maintains an information "reach-back" capability to TEU's Emergency Operations Center for communications with chemical/biological agent, explosive ordnance, and disaster response subject matter experts.

***Deployment*:**
***Equipment*:** One CBRT: 2 Vehicles (M1008s or Suburban)
2 463L pallets or ISU containers

***Personnel*:** One CBRT: 12 personnel
***Time requirements*:** The TEU maintains one CBRT on a 24-hour on-call status and can be ready to deploy ("wheels up") within four hours.
***Location*:** Aberdeen Proving Ground, MD
Dugway Proving Ground, UT
Pine Bluff Arsenal, AR

U. S. Army Medical Research Institute of Chemical Defense (USAMRICD)
Medical Chemical Biological Advisory Team (MCBAT)

(Contact information appears in Appendix C)



***Mission*:** To provide input in the development of operating procedures and training in the management of chemical agent casualties. The Medical Chemical Biological Advisory Team (MCBAT) also provides clinical advice and consultation in matters related to the initial and long-term management of chemical casualties at the incident site. The experts on this team are from the USAMRICD and the U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID). They provide essential medical information during the recovery phase of the operation for the safe return to normal activities.

The MCBAT also provides on-site training to medical professionals on the Management of Chemical and Biological Casualties.

***Capability*:** The MCBAT is the primary source of medical information dealing with the management of chemical warfare agent casualties for the federal government. Through the Federal Bureau of Investigation or agencies within the Department of Health and Human Services, the MCBAT may provide consultation to state, city, or local agencies.

The MCBAT will provide requisite consulting information to the incident commander by identifying the medical implications to military and/or civilian operation and immediate response. As necessitated, the MCBAT supervises the collection of biological samples (bodily fluids) for subsequent verification of chemical agent exposure that can be used to facilitate the confirmation, diagnosis, and treatment.

The MCBAT is in contact with other subject matter experts (SMEs) at the USAMRICD and USAMRIID for additional information. The MCBAT is led by a physician and will be comprised of two or more individuals, depending on situational requirements. Team members are on call 24 hours a day by either telephone or pager. The team is equipped with personal protection equipment to perform its intended mission, related general-purpose equipment, and related supplies.

***Deployment*:**
Equipment. MOPP Gear (does not include supplies or equipment for detection, decon, or treatment).
Personnel: Two to four personnel per MCBAT.
Time requirements: The MCBAT is capable of wheels-up deployment within four hours of notification.
Location: The USAMRICD is located at Aberdeen Proving Ground, MD.
The USAMRIID is located at Fort Detrick, MD.

Chemical Stockpile Emergency Preparedness Program (CSEPP). CSEPP is a joint FEMA–Army program in which local assets are supplemented to respond to accidents/incidents at each of the eight chemical agent stockpile locations. Through this program, the Army provides technical assistance and required

resources in developing and implementing emergency response plans and related preparedness capabilities, integrating the on- and off-post planning process.

Air Force Technical Applications Center (AFTAC). AFTAC located at Patrick AFB, FL, provides post-detonation plume trajectory prediction, meteorological modeling, complete plume analysis/characterization, and leading edge technology development for monitoring of chem bio activities. AFTAC deploys a dedicated C-135 collection platform aircraft stationed in Omaha.

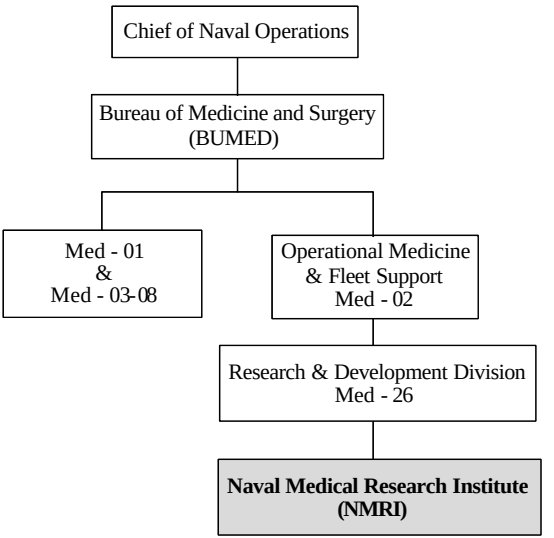
Additional capabilities are possessed by:

52d Ordnance Group (EOD)

Madigan Army Medical Center
Disaster Assistance Response Team (DART)
Response Task Force East (RTF-E)
Response Task Force West (RTF-W)

BIOLOGICAL

Naval Medical Research Institute (NMRI) (Contact information appears in Appendix C)



***Mission*:** To defend members of the Armed Forces against a biological threat in a theater of operations, rapid biological detection methods are essential for prompt medical intervention and successful mission accomplishment. To provide for such needs, the Naval Medical Research Institute's Biological Defense Research Program (BDRP) has formed a scientific research program for the development of rapid detection and identification methods for biological warfare agents.

***Capability*:** The BDRP has developed a capability that consists of a transportable biological field laboratory, expressly for identification of biological warfare agents.

The field lab is comprised of four basic parts:

1. Basic microbiological techniques and bacterial culture identification
2. Enzyme-linked immunosorbent assay (ELISA) capability
3. Hand held chromatographic assays, also referred to as "tickets"
4. Polymerase chain reaction (PCR) capability

The field lab can process approximately fifty samples (four to five samples a day for a period of approximately two weeks) before replenishment of supplies is required. However if enough advance notice is given, additional supplies can be deployed. The field lab operators bring along all necessary lab equipment for operation. In addition to the capabilities of the NMRI field lab, the USAMRIID laboratories provide a confirmatory and reference capability. This support would be required if the results from the NMRI field lab assays were all negative and a suspicion of BW agent contamination still existed.

Deployment:

Equipment: The field lab can be packaged into six to seven boxes with a total weight of 350 to 400 pounds.

Personnel: Two or three operators (from BDRP) with specialized training are required to operate the field lab.

Time requirements: The field lab can be ready to deploy within four hours of notification.

Location: The field lab components are located at NMRI, Bethesda, MD.

U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID) (Contact information appears in Appendix C)

***Mission*:** Conduct research to develop strategies, products, information, procedures and training programs for medical defense against biological warfare threats and infectious diseases. Develop products, such as vaccines, drugs, diagnostic tests, and medical management procedures, to protect military personnel against biological attack or against endemic infectious diseases. Provide medical and scientific subject matter experts, and their technical expertise and guidance to commanders and senior leaders on prevention and treatment of hazardous diseases and management of biological casualties. Serve as the DOD reference center for identification of biological agents from clinical specimens and other sources.

***Capability*:** USAMRIID has many capabilities that can be employed for assessing and evaluating a biological terrorist incident, from initial communication of the threat through incident resolution. The primary capabilities provided by USAMRIID are intellectual capability (consulting), extensive fixed confirmatory and reference laboratory facilities, and the Aeromedical Isolation Team.

USAMRIID can provide two personnel, a medical doctor with expertise in management of casualties caused by biological warfare agents and a scientist with laboratory and scientific expertise on BW agents to participate in the initial response to a potential or known biological incident. The intent of providing the subject matter experts is to aid in evaluating the threat, aid in characterizing BW agent(s), assessing impacts resulting from dissemination, identifying protection and treatment strategies, and formulating medical and operational plans for consequence management and diagnostic support.

USAMRIID's extensive laboratory facilities offer confirmatory and reference capabilities, for use by the Naval Medical Research Institute's mobile laboratory and any other agency requiring such services. In addition to the laboratory and BW agent expertise, a

limited capability exists to transport one or two biological casualties, requiring specialized containment, to a medical containment care facility located at USAMRIID with the support of the Aeromedical Isolation Team (AIT). The facility has a 16-bed ward with a capability of isolating up to biocontainment level (BL) 3, infectious diseases in a contingency situation. The facility also has a special BL 4 containment care facility with a maximum capacity of two beds and offers additional specialized care capabilities, to include limited intensive care.

Aeromedical Isolation Team

***Mission*:** To maintain the personnel, skills and equipment necessary to transport and provide patient care under high containment for a limited number of individuals exposed to or infected with highly contagious and dangerous diseases that are a result of naturally occurring organisms, biological warfare agents, terrorism, and possibly exposure of field researchers.

***Capability*:** The AIT is a rapid response unit that can deploy to any area of the world to transport and provide patient care under high containment. Currently there are no personnel assigned directly to the AIT. The AIT possesses a limited capability, equipment and staff, which is not feasible for use in a mass casualty situation. The AIT is comprised of two teams, each capable of transporting a single patient.

***Deployment*:** Aeromedical Isolation Team only

Personnel: 4 Physicians, 1 Nurse/OIC, 6 combat Medics, 1 NCO, 1 LPN and 2 Lab Technicians.

Time requirements: The AIT's goal is to deploy, (wheels up), in four hours.

Location: The AIT is located at USAMRIID, Ft Detrick, MD. The team deploys from Andrews Air Force Base, MD, or utilizes the West Virginia National Guard assets at Martinsburg, WV. Additional capabilities are possessed by:

United States Marine Corps

Chemical Biological Incident Response Force (CBIRF)
Madigan Army Medical Center
Disaster Assistance Response Team (DART)
Response Task Force East (RTF-E)
Response Task Force West (RTF-W)
U.S. Army Technical Escort Unit (TEU)
Medical Chemical Biological Advisory Team (MCBAT)

3.2.2 Civilian Agencies

Federal Emergency Management Agency (FEMA) (Contact information appears in Appendix C)

Urban Search and Rescue Team (USRT**).** The USRTs save lives and protect property from both natural and man-made catastrophic urban disasters. USRTs have a limited HAZMAT capability.

Rapid Response Information System (RRIS). The RRIS is a database containing information on federal NBC response capabilities, NBC agents and munitions characteristics, and safety precautions.

Department of Health and Human Services (DHHS) (Contact information appears in Appendix C)

Metropolitan Medical Strike Team (MMST). The MMSTs operate as a specially organized team. Their capabilities include agent detection and identification, patient decontamination, triage and medical treatment, patient transportation to hospitals, and coordination with local law enforcement activities. Twenty-seven teams have been initiated. The federal government's goal is to develop MMSTs for the 100 most populous cities in the U.S.

National Medical Response Team (NMRT). The NMRTs are comprised of medical personnel. These teams are capable of agent identification, patient decontamination, triage and medical treatment in support of local health systems. There are three NMRTs.

Center for Disease Control and Prevention (CDC). The CDC capabilities are epidemiological surveillance, biological agent identification, and public health consultation and response.

Agency for Toxic Substance and Disease Registry (ATSDR). The ATSDR provides consultation and advice on issues relating to the release, or threatened release of hazardous substances.

Federal Drug Administration (FDA). The FDA provides regional laboratory support and surveillance assistance in support of public health.

Substance Abuse and Mental Health Services Administration (SAMHSA). The SAMHSA provides mental health support and crisis counseling during emergencies.

Federal Bureau of Investigation (FBI) (Contact information appears in Appendix C)

National Domestic Preparedness Office (NDPO). The mission of the NDPO is to coordinate federal domestic preparedness activities and to serve as a clearinghouse for information to state and local first responders. Working in conjunction with other federal agencies, the NDPO acts as a single point of contact for first responders to access information about and receive assistance from the multitude of federal domestic preparedness programs.

Hazardous Materials Response Unit (HMRU)**.** The HMRU has specialized sampling, detection and identification capabilities of NBC agents. Also equipped with a variety of personal protective (OSHA Levels A - C) and rescue equipment.

Evidence Response Teams (ERTs**)**. The ERTs main functions are crime scene documentation and evidence collection in support of criminal investigations. Some ERTs are HAZMAT trained.

Critical Incident Response Group (CIRG). These teams are specially assembled to conduct tactical and crisis management efforts.

Intelligence Collection and Analysis. The FBI has experts that contribute to and coordinate detailed interagency threat assessment activities.

Environmental Protection Agency (EPA) (Contact information appears in Appendix C)

On-Scene Coordinators (OSCs). Under the authority of the National Contingency Plan, EPA OSCs coordinate all Federal containment, removal, and disposal efforts and resources during an incident. EPA OSCs work with state, local and private responders to protect human health and the environment. EPA has approximately 185 OSCs at 17 locations nation-wide. (The United States Coast Guard also has OSCs for incidents in coastal areas.) For site-specific assistance, EPA OSCs can provide responders with access to any of the resources described below:

(a) Environmental Response Team (ERT). EPA's ERT can provide 24-hour access to special decontamination equipment for chemical releases and advice to the OSC in hazard evaluation; risk assessment; multimedia sampling and analysis; on-site safety; clean-up techniques, and more. The ERT has portable chemical agent instrumentation capable of detection and identification in the low and sub parts per million, as well as entry-level capabilities using Level "A" through "C" personal protective equipment.

(b) Radiological Emergency Response Team (RERT). EPA's RERT can provide on-site monitoring and mobile laboratories for field analysis of samples, along with expertise in radiation health physics and risk assessment. The RERT is accessible 24 hours per day.

(c) Environmental Radiation Ambient Monitoring System (ERAMS). EPA operates ERAMS for monitoring radioactivity in samples of precipitation, air, surface water, drinking water, and milk. In the event of a radiological emergency, sampling at the approximately 260 monitoring sites can be increased to provide information on the spread of contamination.

(d) Radiation Environmental Laboratories. EPA has two state-of-the-art radiological laboratories in Montgomery, Alabama, and

Las Vegas, Nevada. By quickly characterizing radiation sources, they can offer advice on how best to protect public health in emergency situations.

(e) EPA Research Laboratories. EPA's 12 research laboratories offer programs in field monitoring, analytical support, and other technical support to quality assurance programs related to air, water, wastewater, and solid waste. Five of these laboratories are capable of deploying mobile units to a contaminated site for chemical and biological analysis.

(f) National Enforcement Investigations Center (NEIC). EPA's NEIC offers expertise in environmental forensic evidence collection, sampling, and analysis; computer forensics and information management; and enforcement-related technical analysis.

Department of Energy (DOE) (Contact information appears in Appendix C)

Radiological Assistance Program (RAP). The RAP provides the initial DOE radiological emergency response. Under the RAP, there are several Radiological Assistance Teams (RATS) to assist in identifying the presence of radioactive contamination on personnel, equipment and property at the accident or incident scene. These teams also provide advice on personnel monitoring, decontamination, and material recovery.

Radiation Emergency Assistance Center/Training Site (REAC/TS). The REAC/TS provides 24-hour medical consultation on health problems associated with radiation accidents. It also provides training programs for emergency response teams.

Nuclear Emergency Search Team (NEST). The NEST provides technical response to resolution of incidents involving improvised nuclear and radiological dispersal devices. The team is able to search, locate, and identify devices or material.

Joint Technical Operations Team (JTOT). The JTOT is a combined DOD and DOE team that provides technical advice and assistance to DOD.

Aerial Measuring System (AMS). The AMS provides helicopters and fixed wing aircraft to respond to radiological emergencies. Its capabilities include aerial radiation surveys and search (gamma spectroscopy), real-time radiological aerial sampling, aerial photography survey, and aerial multi-spectra scanning surveys.

Atmospheric Release Advisory Capability (ARAC). The ARAC provides real-time computer predictions of the atmospheric transport of radioactivity from a nuclear accident or incident.

Federal Radiological Monitoring and Assessment Center (FRMAC). The FRMAC coordinates federal off-site radiological monitoring and assessment activities for a nuclear accident or incident.

Accident Response Group (ARG). The ARG is the technical response group for U.S. nuclear weapons accidents. The team provides equipment and technical assistance for weapon damage, risk assessment, safe recovery, packaging, transportation, and disposal of damaged weapons.

Section 4. Consequence Management

The initial actions, taken in the early minutes of the response to a WMD, are critical to the outcome—success or failure. While little can be done at an individual facility to prevent a hostile act from another nation, deterring a terrorist WMD incident should be a primary goal of any installation or DoD facility. Every commander should be thoroughly familiar with the Installation AT/FP Plan. The Joint Staff has developed an Installation Planning Template (IPT) that will help installations create an AT/FP plan or modify existing plans.

While planning and preparation will prove to be essential elements of a successful, timely response, the remainder of this section will focus on consequence management and the response to a WMD incident. This section is geared toward providing key considerations and background knowledge for commanders to ensure a smooth response. It provides enough *response* detail to ensure that commanders have a clear view of the *response proces*s.

Note that some of the general details do not specifically follow functional area or service specific instructional documents; that is intentional. This handbook is based on the assumption that a response to most WMD incidents would grow from an existing DoD facility or installation emergency response capability. From there, the handbook seeks to bridge the gaps between each of the key response functional areas. This section depicts a complete, structured response and fills in the relevant existing doctrinal and instructional gaps.

4.1 Notification

In the event of a WMD incident, the installation should conduct the following complementary sets of actions:

- Activate the installation's initial response elements and local MOA/
- MOUs

- Initiate the notification process
- Request resources to augment the installation's response capabilities

WMD incidents may overwhelm an installation's minimum capability to adequately detect, assess, or contain the threat. DoD facilities and installations—like most local, state, or Federal entities—have neither the authority nor the expertise to respond unilaterally to all aspects of WMD threats or acts. The tenets of the Federal Response Plan will help an installation develop its response based on crisis and consequence management.

- Crisis Management—includes those response measures or actions required to identify, acquire, and plan the use of all resources needed to anticipate, prevent, or resolve a threat or act of terrorism; it is primarily a law enforcement response which focuses on the criminal aspects of the incident.
- Consequence Management—includes those response measures required to protect the health and safety of DoD personnel and families, and to maintain or to restore the capability to continue the DoD's strategic mission.

The FBI, as the Lead Federal Agency (LFA), will assume the crisis management role in the United States, its territories and possessions, or other places that have U.S. jurisdiction while the Federal Emergency Management Agency (FEMA) will be responsible for consequence management. DoS will assume both crisis and consequence management roles in foreign countries. It should be noted that the crisis management function will differ between a terrorist incident and an act of war by another nation. Consequence management activities will, however, remain the same for both types of incidents.

The Federal Response Plan, or the appropriate Federal agencies, will be activated as required by the National Command Authority. There is also the option for the state's governor to activate the National Guard to support response efforts. Once the FBI or DoS assumes control of the WMD incident, the commander responds to

the FBI or DoS but remains in command of DoD personnel and resources.

While it may appear prudent for the installation to make direct requests to self-initiate or activate a USG/State/DoD specialized response element (that may be only 2 hours away) or to activate the State Response Plan, it is important to remember that there is a USG/DoD hierarchical relationship and a notification/resource activation process. Therefore, an understanding of the notification and resource activation process is critical. As first responders initially assess the incident and make a determination that the magnitude will overwhelm all base and local resources, the installation may deem it necessary to appeal for assistance from higher levels.

4.1.1 Notification for Domestic WMD Incidents

In accordance with CJCSM 3150.03, the installation will submit an OPREP-3 report where national-level interest has been determined. Therefore, in the event of a WMD incident, the installation will send an OPREP-3 (flagword PINNACLE) directly to the National Military Command Center (NMCC). The goal is to make initial voice reports within 15 minutes of an incident, with message report submitted within 1 hour of the incident. The initial report must not be delayed to gain additional information. Follow-up reports can be submitted as additional information becomes available.

The installation will submit voice reports sequentially to the NMCC, appropriate CINCs, and the reporting unit's parent Service and intermediate superior command. Conference calls or concurrent telephone calls should be considered if no delays are encountered and security can be maintained. In accordance with CJCSM 3150.03, there will remain an open line between the NMCC and the installation throughout the duration of the incident.

NMCC telephone numbers are:

DSN Primary: 851-3840

DSN Secondary: 725-3530

DSN Tertiary: 227-6340

Commercial: 703-521-1014

Washington Switch: 703-697-1201

Drop: DSN 312-1048/1049/1050/1051

All OPREP-3 reports will be submitted as soon as possible after an event or incident has occurred and sent at FLASH or IMMEDIATE precedence.

Message Address: JOINT STAFF WASHINGTON DC//J3 NMCC//

4.1.2 Notification for Foreign WMD Incidents

Oversight and management of a WMD incident on a DoD facility or installation in a foreign country differs from the process outlined in paragraph 4.1.1 in the following manner.

- For WMD incidents that occur on DoD installations in foreign countries, the DoS is the lead federal agency for both crisis management and consequence management responsibilities.
- DoD facilities located in foreign countries should establish Host Nation (HN) agreements to address the use of installation security forces, other military forces, and host-nation resources that clearly delineate jurisdictional limits. The agreements will likely evolve into the installation having responsibility "inside the wire or installation perimeter" and the HN having responsibility "outside the wire or installation perimeter." Exceptions may exist, due to the wide dispersal of work and housing areas, utilities, and other installation support mechanisms that require the installation to be responsible for certain areas outside of the installation perimeter.
- CINC (Unified Command): The CINC is responsible for managing the event. However, should the incident require greater resources, the CINC may need to request additional assistance from the U.S. Joint Forces Command (USJFCOM).

- CINCUSJFCOM has the responsibility to support U.S. installations in foreign countries to augment limited resources, in accordance with UP CJCSI 3214.01. USJFCOM has access to resources and specialized units from each of the four Services to augment assistance in the event of a WMD incident.

4.2 Initial Response

The initial response phase begins when the initial response element, or IRE, (firefighters, security forces, and medical responders) deploys to the scene of the incident. Explosive Ordnance Disposal (EOD) may be part of the IRE, if the situation dictates. First responders must approach the incident area with care, so as not to become victims themselves. They must be cognizant of warning signs indicating the presence of lethal agents or potential hazards; they should also be aware that WMD incidents—particularly terrorist attacks—may be masked by a hostage situation, disgruntled employees, protests, or accidents. If hostile forces are present, the senior security forces officer will retain on-scene command until the threat is neutralized.

The Senior Fire Official (SFO) will determine the parameters of the hot and warm zones that comprise the incident site. The SFO will exercise command and control of the immediate incident site, with direct control of the hot zone falling to another designated fire officer. The On Scene Commander (OSC)—the installation commander's designated representative—will exercise command and control of the entire incident scene, including hot, warm, and cold zones. The first responders will approach the incident site from upwind, maintaining a safe distance from the site. If there is confirmation that no victims are involved, the SFO may conduct detection, and simply cordon off the area to conduct decontamination operations. However, the likelihood of victims is extremely high when dealing with a WMD incident. The SFO will assume control of the incident site, as firefighters are typically the only functional experts specifically trained, qualified, and equipped

to operate in the incident site. Regardless of the nature of the situation, the incident site must be treated as a crime scene, as it may be a terrorist attack.

Per Presidential Directive 39, 21 June 1995, the DoJ, through the FBI, will be the lead federal agency for crisis management in the case of a WMD event within the United States, its territories and possessions, the District of Columbia, and other places subject to U.S. jurisdiction. Department of State will have the lead in a WMD event against a U.S. installation in a foreign country. These departments will automatically be involved in the event of an incident.

If WMD materials are suspected or detected, the installation commander will ensure that appropriate notification and reporting requirements are accomplished. While the FBI or DoS may assume jurisdiction for the investigation, the installation commander must provide the initial and immediate response to any incident occurring on the installation in order to isolate and contain the incident. In all cases, command of military elements remains within military channels. The designated installation command post will simultaneously activate the Disaster Response Force (DRF).

Response at the incident site should be initially limited to the IRE; the severity of the incident may dictate that the OSC and other functional representatives of the DRF remain located some distance away. The SFO/OSC may request follow-on elements from the various functional areas, depending on the situation. The DRF should assemble at a predesignated location. The assembly point for the OSC and DRF should be at a safe distance from the incident site to prevent interference with the IRE and to reduce exposure of DRF members to unnecessary hazards. While not all DRF members may be required in the early phases of the response, they can provide valuable advice and assistance in the myriad of ongoing tasks and begin coordinating for follow-on resources if needed. The DRF members should review both their individual DRF member checklists and their functional area responder checklists to get themselves thinking about what they need to do immediately and

what they might need to do in the future. In a potential WMD environment, OSCs should limit the number of additional personnel responding to or near the incident site (other than those requested by the SFO).

The OSC must rely on the SFO to make an accurate determination as to when it is prudent to relinquish command to the OSC. This may be when all initial emergency actions are completed and the SFO feels it is safe for the OSC and DRF to move forward to the incident perimeter. The SFO should evaluate the situation and determine whether it is safe and practical for the OSC or anyone to proceed closer.

The IRE must begin determining the nature of the incident. If no detection capability exists, the IRE must be prepared to continue response operations until such time as a DoD team with detection capability (or other coordinated support) can arrive at the installation. If follow-on forces are required, the IRE will remain on-site to alert follow-on forces to the extent and characteristics of the incident. The IRE will begin establishing the incident site. Due to the highly hazardous and technical nature of the various type WMD incidents, and because a large number of responders will be required to mitigate this type of emergency, the initial stages of the incident response will seem to proceed slowly. However, it is for those same reasons that personnel must proceed with extreme caution to ensure their safety and plan an appropriate response. If first responders do not have the necessary personnel or equipment available, there may be a delay awaiting the arrival of properly trained personnel or specialized response equipment or vehicles. In addition, numerous support personnel will be needed. A number of tasks involved at this juncture may be occurring almost simultaneously. Incident priorities will dictate that the limited resources available be deployed to certain tasks before others.

4.2.1 Initiate Protective Measures

If there are suspected indications of a WMD incident and the presence of hazardous agents, qualified first responders will use the

appropriate level of protective gear. Without protective clothing and breathing apparatus, any additional personnel entering the affected area may become casualties themselves. Most agents will penetrate ordinary clothing, and standard tactical military individual protective clothing and masks may afford protection against only some agents, in which case efforts to rescue personnel will result in responder contamination.

4.2.2 Contain the Threat Area

Before any rescuers enter the hot zone, the SFO/OSC should determine the cordon size based on the presence or suspected presence of hazardous agents by type. The security forces then establish the cordon perimeter based on the OSC's recommendations. They will control access to the site by establishing an entry control point (ECP), which will serve as the sole entrance and exit from the incident site. The security forces will also control the ECP and allow only those with verified authorization by the OSC to enter the site. The security forces will establish entry control point procedures, such as badging to control access to the incident site. The firefighters should establish decontamination lanes (for both victims and responders); the lanes must be staffed by adequate numbers of qualified personnel. Medical personnel should ensure that personnel donning entry suits receive pre-entry physical screening. Base engineering should ensure that steps are taken to protect critical systems (for example, public utilities and medical facilities) to preclude further damage. The OSC should establish and maintain communications between the incident site and the Base Command Post (or DRF, if established) to transmit the most up-to-date information, forming an accurate picture for the commander and response forces.

Responders should begin stabilizing the incident and limiting its impact. Each installation must maintain the minimum response capability required to reduce or isolate an incident to mitigate or prevent further risk or damage to persons, equipment, facilities, and

the environment. The installation's emergency response capability must meet the baseline containment requirement for WMD threats.

NOTE: Since terrorists may execute several incidents in quick succession, initial responders must be aware of this tactic, and alert to the possibility of secondary devices, not only when they arrive at the incident site, but also throughout the response phase, until responders can conduct a thorough search of the area. This concern is less viable if the attack was instigated as an act of war by another nation.

4.2.3 Identify the Threat Agent

First responders must have agent detection capability. This capability will allow responders to identify specific threats. The IRE will already have established the incident site, and by this time the where necessary trained personnel and response equipment or vehicles should be standing by. First responders may have been able to make preliminary identification of agents used in the incident, but if the test results were negative or ambiguous, more sensitive detection methods may be employed to accurately assess the threat. Trained detection teams will gather additional information through the employment of specialized warning and reporting systems or kits and sampling of material and environmental items in the contained area.

Biological and unknown chemical agent samples must be evacuated through controlled channels to a laboratory facility for definitive identification, preferably through the Army Technical Escort Unit (TEU) located at Aberdeen Proving Grounds, Maryland. A specific chain of custody, packaging, and marking requirements apply to all items removed from the scene.

If the detection capability does not exist or is not adequate for the incident at hand, the IRE must be prepared to continue response operations until a DoD team or other coordinated support can arrive at the installation. If follow-on forces are required, the IRE will remain on-site to alert follow-on forces to the extent and characteristics of the incident. When possible, any agent must be

collected for definitive identification through a specialized laboratory.

4.2.4 Predict the Effects

A hazard prediction will be conducted based on the type of agent and weather conditions. Several computer software programs can assist in identifying Hazardous Materials and WMD agents, completing hazards analysis (plume or oil spill modeling), resource management, and assisting emergency management. The HAZMAT emergency planning team should compare the software capabilities against the required information for hazards identification, vulnerability analysis, risk analysis, capabilities assessment, and plan development to ensure that the software enhances the HAZMAT emergency planning team's capabilities. Existing and emerging software programs can be used to assist in the identification and warning processes. In responding to a WMD incident, first responders must be able to provide critical resources within the first few minutes to contain and mitigate the effects of the incident.

After the SFO's initial size-up of the situation, additional local responders may be requested. Maintaining mutual aid agreements with the local civilian community is a key component of a viable installation response capability. If the DRF is present at the incident site, the DRF functional representatives will coordinate with their local counterparts to activate resources in accordance with pre-established Memoranda of Agreement or Understanding (MOAs/MOUs). If the DRF is not present, the SFO will request activation of resources through the Installation Command Post. If it appears that the incident will exceed the base and local resource capabilities, it may be necessary to appeal for assistance at higher levels. Structures are in place within the DoD and at the national level to respond to WMD incidents. National-level responders (such as FEMA, DoE, or RAID teams) may not be immediately accessible or available to respond to an installation's needs. Therefore, each installation must plan for a large-scale WMD incident by focusing its response for each functional area, based on

its organic resources and mutual aid (local support). The installation must be prepared to conduct not only the initial response, but also sustained response operations until additional assets can be notified and deployed to the site.

4.2.5 Protect the Base and the Community

If it is apparent that the incident will affect a portion of the base populace or local community, the on-scene commander should initiate procedures to warn, advise, or evacuate personnel. The designated installation command post can activate a public address notification system or similar base notification procedures and contact the proper civilian authorities. The installation commander should consider implementing THREATCON measures or other defensive/response actions as appropriate.

4.2.6 Avoid Contamination

Every effort must be made to avoid further contamination of first responders and the base populace. As a result of the plume analysis, the OSC, with the assistance of the environmental and weather representatives, may be able to predict what area must be evacuated to avoid further contamination. The security forces will carry out the evacuation procedures but will at no time enter the hazardous area unless they have the proper Individual Protective Equipment (IPE). Weather conditions may change or shift, requiring movement of the cordon/ECP and resulting in the evacuation of affected areas.

4.2.7 Conduct Emergency Decontamination of Responders and Patients

Firefighters must establish a decontamination lane to process responders, contaminated casualties, and contaminated but uninjured persons. All responders must remember that if they are inside the cordon and are contaminated, they must be decontaminated before disrobing or receiving any necessary medical treatment. The senior medical representative should set up

a patient identification and tracking system. Information should be relayed to the receiving medical treatment facility if a patient enroute is suspected of not being fully decontaminated at the incident site.

Arrangements should then be made to decontaminate patients at the medical facility. The SFO/OSC will determine the requirement for vehicle and equipment decontamination and recommend to the installation commander, activation of decontamination teams as necessary in accordance with the Installation's WMD Plan.

4.3 Continued Response

This sub-section highlights the criticality of establishing MOA/MOUs with the local community during the pre-incident planning phase. Coordination with the local elements improves the response times and offers the opportunity to share critical resources needed to mitigate the effects of an incident.

4.3.1 Site Management Operations

The OSC will assemble the functional areas upwind from the incident site, outside the contamination control line. Site management should include a means to maintain rapid accountability for each member engaged in activities at the incident site. The procedures should include a means to specifically identify and keep track of members entering and leaving the hot zone and any area where special protective equipment is required. In the event that Federal authorities assume command of the scene, the installation and local responders must be prepared to efficiently and properly transfer command. These actions will best ensure the safety of responders on the scene and continued operations to best protect the health and safety of both responders and the general public.

4.3.2 Casualty Management

Medical Services will provide emergency medical response at the incident site, including lifesaving medical care and support for

responders. Issue of chemical-biological agent pretreatment drugs, prophylaxis medication, and antidotes will be determined based on type of incident and availability. Ideally, when medically appropriate, patients should be decontaminated before leaving the scene. However, if decontamination is incomplete, or if contaminated persons leave the scene voluntarily, the receiving medical facility (military or civilian) must be prepared to decontaminate these patients. Once the medical facility is notified of a WMD incident, all medical facility personnel engaged in the response should be notified of the nature of the emergency and the type of suspected contamination. The medical facility should equip all necessary personnel with appropriate personal protective equipment (PPE) and prepare to accomplish any additional decontamination as necessary.

NOTE: Many DoD installations no longer have impatient medical facilities or 24-hour operations. Civilian hospitals *may not* accept "contaminated" patients. These issues need to be addressed in MOAs/MOUs with the host nation or local community. Commanders should arrange to have designated decontamination areas. Environmental personnel, in conjunction with facility management, and emergency services staffs, will determine the most appropriate location for a medical facility's decontamination area.

Although areas dedicated solely to decontamination need not be set aside, medical facilities must take appropriate precautions to prevent the spread of contamination to other areas within the facility. Decontamination should be performed in areas that will minimize any spread of contamination to personnel or equipment. An alternative to an indoor decontamination area would be an outside or portable facility. This might include wading pools or outdoor showers, along with bags for disposal of contaminated clothes. Plans and provisions must be made for managing patients' personal effects.

Airborne contaminants may be transported via the medical facility's ventilation system. Therefore, ventilation in the

decontamination area should be separate from the ventilation system for the rest of the facility. Morgues, with an isolated ventilation system, are often used as decontamination rooms. If a contaminated victim is emitting airborne contaminants and the ventilation in the decontamination room is not self-contained, the ventilation system in the decontamination area should be turned off. However, not all chemicals will be volatile enough to cause off-gassing. Because medical personnel could be at risk if the ventilation system is shut off during decontamination in an enclosed area, ambient air should be monitored using appropriate direct-reading instruments, and the plan should provide means of supplementary or auxiliary ventilation. Prior to restarting the ventilation system, air monitoring with appropriate direct-reading instruments is advised to be sure that the atmosphere is safe for circulation. The use of direct-reading instruments to evaluate air quality must be made by an individual who has been properly trained in the use of the instruments.

4.3.3 Control the Incident Site

Because a WMD incident maybe initiated by a terrorist, the security forces should maintain the incident site as a crime scene until relieved by the applicable investigative element. Physical evidence is often the most reliable, and serves a crucial part in connecting the perpetrator to the scene. No evidence, including a confession, is incontestable.

The control of classified information is an additional concern that must be addressed. It is everyone's responsibility to protect classified information, especially owners/users. The OSC, in conjunction with the security forces, should determine procedures for securing classified information and materials.

4.3.4 Contain Contaminated Material

The primary objective is to ensure that the incident does not extend beyond the cordoned area. The installation's populace should be notified to ensure that it takes proper precautions. It may be

necessary to shelter the population in place rather than risk further danger. This would entail shutting off all ventilation systems and ensuring that all doors and windows are closed and airtight.

4.4 Recovery

The recovery phase begins when the immediate hazards are contained.

This phase may be delayed due to factors such as the extent and severity of the incident and the ongoing investigation efforts by the FBI.

Depending upon the nature of the WMD incident, extensive damage, mass casualties and contaminated areas could result. Significant recovery operations would be required, as well as outside assistance. During this phase, it is necessary to obtain additional information about the incident, and to develop and carry out a recovery plan. The OSC has primary responsibility to approve all recovery actions and will develop a recovery plan to be approved by the installation commander.

During the recovery phase, access to the site will be granted by the appropriate office of primary responsibility. All personnel entering the site will be accounted for and properly protected and briefed on the hazards and emergency withdrawal procedures. Site access authority and custody of wreckage and other physical evidence may be relinquished to the Department of Justice FBI Team Chief by the OSC when the scene is considered safe. Additionally, supporting DoD assets needed for follow-on investigative support must be requested through the OSC.

4.4.1 Conduct Area Decontamination

To be effective, the OSC must be prepared to:

- Decontaminate the most important items (mission and health essential) first and the least important items last.

- Decontaminate only what is necessary. Consider the mission, time, the extent of contamination, protective equipment status, and the decontamination assets available.
- Decontaminate as close to the site of contamination as possible. Do not move contaminated equipment, personnel, or remains away from the operational area if it is possible to bring decontamination assets (organic or supporting units) forward safely. This will keep the equipment on location, speed decontamination, and limit the spread of contamination to other areas.
- Additional decontamination options include: disposal isolation, weathering, or natural chemical breakdown.

Therefore, installation commanders must have the capability to quickly and effectively conduct area decontamination as required to allow safe passage and future use of the area by authorized personnel. Coordination with the environmental and base engineering representatives for requirements to control and dispose of all contamination or runoff, and requests for support may be necessary. The environmental and base engineering representatives should determine the safety of these areas based on the type of agent and other safety concerns. Proper decontamination is critical and costly in terms of manpower, time, space, material, and other assets.

4.4.2 Implement a Mission Recovery Plan

This task normally begins with an assessment of the area after the scene has been declared safe. The OSC has primary responsibility to approve all recovery operations. Restoration of the area is a long-range project, but general restoration steps should appear in the plan. Top priorities are reestablishing mission capability, developing a plan to cover short- and long-term recovery requirements, and returning to normal operations. Specific consideration should be given to the mitigation of damage to the environment.

The recovery plan should address, if applicable:

- Medical, firefighting, security, utilities, and logistics support
- Procedures to document and report resource expenditures
- Contamination control
- Environmental considerations to prevent pollution and restore the area
- Render safe or mitigate explosive hazards
- Removal of hazardous material
- Individual Protective Equipment (IPE) post-traumatic stress, blood-borne pathogen exposure, medical screening, and bioassay requirements and procedures for all victims and responders
- Preparing property damage and personal injury estimates
- Public affairs activities
- Liaison with DoD, State, Federal, and civil investigation officials
- Wreckage removal
- Site restoration
- Mishap investigation requirements
- Developing a "lessons learned" report

4.4.3 Assess and Repair the Installation Infrastructure

Assessment of the installation's infrastructure and assets after an attack is conducted by all functional areas. Areas and assets to be surveyed may include all aircraft, facilities, vehicles, and equipment. Relocation of such items may be necessary if persistent contamination is still present.

Chemical and biological agents used in an attack usually would not cause much physical damage to the installation, only contamination.

NOTE: A special problem is associated with contamination that tends to settle in basements and other low areas, rubble piles, and similar collections of debris, or into porous surfaces. This concentration could extend the lethality period of chemical and biological agents. A device producing a nuclear yield or using a radiation-dispersion device may be accompanied by structural damage. The damage would be limited by the size of the conventional explosive; residual radiation would be the real danger. If radioactive residue is found, coordinate disposal efforts with the proper authorities.

4.4.4 Post-Incident Analysis/Review

- Work with investigation teams. Appropriate officials will investigate and identify the cause of the WMD incident. Report their findings.
- Compile inputs from all participating units.
- Periodically review the OSC's checklist and the Recovery Plan and follow up on open action items.
- Keep track of recovery activities and work with the OSC to arrange DRF briefings when significant actions are completed or due.

The OSC will have completed recovery operations involving DoD resources after:

- Obtaining proof of existence or nonexistence of contamination
- Identifying, accounting for, or recovering all classified and HAZMAT
- Ensuring that representatives from all affected military and civil agencies complete their necessary observations
- Removing wreckage and restoring the site in coordination with Department of Justice investigation officials and, if necessary, civil authorities
- Completing lessons learned/after action reports

4.5 Jurisdiction/Legal Issues

The legal considerations for response to an incident on an installation are complex, varying by location, area affected, time of attack, and type of incident. The following are general legal considerations; they are not foolproof. Commanders should consult their legal staff in the planning process to understand the limitations on response that particular installations might face. Commanders should also assess with their judge advocate general (JAG) the preparedness of the legal staff to deal with terrorist WMD incidents and ensure the staff has received its own training.

This handbook deals with location in terms of incidents that occur domestically within the United States (i.e., within the 50 states, the District of Columbia, U.S. territories or possessions, or other places subject to U.S. jurisdiction) and incidents that occur outside the United States (i.e. in foreign countries in which there are U.S. installations or facilities).

4.5.1 Terrorist WMD Incidents, Domestic

The use of chemical and biological weapons within the United States is a federal offense under Title 18, U.S. Code (USC):

- Section 175 for biological weapons possession
- Section 229 for chemical or biological weapons use as a WMD

The "commander's inherent authority to maintain law and order on a military installation …"coupled with the responsibility to protect DoD personnel, facilities, and equipment also guides response to a prewar incident in the United States, its territories or possessions, the District of Columbia, and other places subject to U.S. jurisdiction. In these cases, the Federal Bureau of Investigation (FBI) has investigative jurisdiction and should be immediately notified when an incident occurs. Incident locations should be treated as crime scenes, insofar as reasonably possible, and the normal chain of custody procedures should be followed for any item that is removed from the incident scene. These authorities,

responsibilities, and actions are in accordance with DoD Directive 5525.5, *DoD Cooperation With Civilian Law Enforcement Officials*, paragraphs E4.1.2.1.3 and E4.1.2.1.5.

Should the effects of an on-installation incident extend to surrounding civilian communities—or when the need to save lives, prevent human suffering, or mitigate great property damage is a concern—the installation may respond to a direct request from a civil authority. The local commander may provide immediate response to save lives, prevent human suffering and mitigate great property loss.

When time does not allow the commander or installation to obtain prior approval from higher HQ, and in response to a direct request from a civil authority, the installation *may* respond—in accordance with DoD Directive 3025.1, *Military Support to Civil Authorities.* Furthermore, the "Immediate Response" shall require from the civil authority a written request that supports the fact of the request, the nature of the response, and other pertinent information as soon as possible—in accordance with DoD Directive 3025.15, *Military Assistance to Civil Authorities.* Military support provided to civil authorities or civilian law enforcement authorities must comply with the restrictions of 10 USC, Section 371 *et. seq.* and 18 USC., Section 1385, as implemented by DoDD 3025.1, DoDD 3025.15 and DoDD 5525.5.

4.5.2 Terrorist WMD Incidents in Foreign Countries

Incidents on U.S. installations in foreign countries generally are governed by a Status of Forces Agreement (SOFA). Most SOFAs, such as NATO SOFA Article VII, paragraph 10, and Japan SOFA Article XVII, paragraph 10, state that the United States has the right to police and maintain order on the premises it occupies. Most SOFAs require that military authorities assist the host nation authority with investigative help and by turning over all evidence. (See NATO SOFA Article VII paragraph 6, JAPAN SOFA Article XVII paragraph 6.) Even when conducted overseas, a chemical or biological weapons attack on any property owned, leased, or used

by any U.S. agency or department, is a Federal offense—in accordance with Title 18 USC, Section 229 (c)(4). Generally, U.S. participation in the investigation of an event will be coordinated at the diplomatic level.

4.5.3 WMD Incidents as an Act of War

The use of chemical or biological weapons in an attack by a belligerent nation against another nation is a violation of the law of armed conflict (LOAC). The use of chemical or biological weapons in an attack by a belligerent nation against any DoD installation, at home or abroad during wartime, should be reported and investigated as a LOAC violation.

NOTE: The terrorist use of biological or chemical weapons, even during wartime, is a criminal act in the country where it occurs, but is not a LOAC violation. Only when nations use biological or chemical weapons does a LOAC violation occur. Combatant Commands are required to ensure that all LOAC violations involving U.S. or enemy persons are reported promptly to appropriate authorities, are thoroughly investigated, and the results of such investigations are promptly forwarded to the applicable Military Department, in accordance with DoD Directive 5100.77, paragraph 5.8.4.. The U.S. Army, as the DoD Executive Agent for LOAC violation issues, is responsible for ensuring that investigations are performed when biological or chemical weapons have been used, as required by DoDD 5100.77, paragraph 5.6.

4.6 Military/Civilian Support

Due to the symbiotic relationship that DoD facilities share with the surrounding communities, it is important to plan for a joint response prior to a WMD incident. In section 4.3, this handbook discussed the importance of establishing MOAs/MOUs with local emergency services, such as fire, police and hospitals. These agreements can allow DoD to augment scarce resources until federal assistance can arrive.

Under the Federal Response Plan, DoD is tasked along with other USG assets to mitigate the effects of a WMD incident. Resources are provided by 27 Federal departments and agencies, as well as the American Red Cross. Federal assistance is brought to bear by the president's appointed Federal Coordinating Officer (FCO). Essential resources are grouped into 12 Emergency Support Functions (ESF), each headed by a Primary Agency:

ESF	Primary Agency
1: Transportation	Dept of Transportation
2: Communications	National Communications Systems
3: Engineering and Public Works	Army Corps of Engineers DoD
4: Firefighting	U.S. Forest Service Dept of Agriculture
5: Information and Planning	FEMA
6: Mass Care	American Red Cross
7: Resource Support	General Services Administration
8: Health and Medical Services	U.S. Public Health Service Dept of Health and Human Services
9: Urban Search and Rescue	FEMA
10: HAZMAT	EPA
11: Food	Dept of Agriculture
12: Energy	DOE

These ESFs have been adapted into DoD policy through the IPT and its WMD Appendix. In the IPT, response capability is divided into WMD Response Functions (WMDRFs). These tailored, installation-level WMDRFs parallel the national-level FEMA ESFs to the greatest degree possible, with one additional requirement -- Security. This parallelism will ensure that if there is a need for Federal assistance that incoming support can easily transition into the appropriate functional areas on the installation.

The WMDRFs are as follows:

- WMDRF #1 - Information & Planning
- WMDRF #2 - Communication
- WMDRF #3 - Hazardous Material (HAZMAT)/NBC
- WMDRF #4 - Security
- WMDRF #5 - Fire Fighting
- WMDRF #6 - Health and Medical Services
- WMDRF #7 - Resource Support
- WMDRF #8 - Mass Care
- WMDRF #9 - Public Works

Additionally, DoD has enunciated its own policies, to detail the actions it will take to support civilian authorities in the event of a WMD incident. According to DoD Directive 3025.1, *Military Support to Civil Authorities*, the Secretary of the Army is the DoD Executive Agent for this issue. The DoD Executive Agent has the authority to commit DoD resources in response to requests from civil authorities under MSCA. The break down of DoD planning agents for MSCA is as follows:

- CINCFOR—Forty eight continental sates and the District of Columbia
- USCINCJFCOM—Puerto Rico and the U.S. Virgin Islands
- USCINCPAC—Alaska, Hawaii, and U.S. possessions and territories in the Pacific

Military Support to Civil Authorities includes but is not limited to those actions required for immediate response, such as saving lives, preventing human suffering, and mitigating great property damage. This assistance may include:

- Rescue, evacuation, and emergency medical treatment
- Emergency restoration of essential services (water, communication, power)
- Emergency removal of debris
- Recovery, identification, and registration of fatalities

- Monitoring and decontaminating the effects of WMD agents
- Roadway movement, control, and planning
- Safeguarding, collecting, and distributing food, water and other essential materials
- Damage Assessment
- Interim Emergency Communications
- Facilitating the re-establishment of civil government functions

Appendix A. Terms and Definitions

AC. Hydrogen cyanide, a blood agent.

Acetylcholine. A chemical neurotransmitter produced by nerve cells predominantly outside the central nervous system. It is a chemical "messenger", stimulating the heart, skeletal muscles, and numerous secretory glands.

Aerosol. A liquid or solid composed of finely divided particles suspended in a gaseous medium. Examples of common aerosols are mist, fog, and smoke.

Agent. See biological or chemical agent.

Agent Detector Kit, M18A2. The M18A2 Kit is designed primarily for detecting dangerous concentrations of vapors, aerosols, and liquid droplets of chemical agents. It is a gross-level detector, but can be used to collect samples of unidentified toxic chemical agents for later identification in a laboratory.

Agent Detector Kit, M256A1. The M256A1 Kit is a colorimetric detector employed by the U.S. military. Sampler detectors contained in the kit are used to test for chemical agents in the air. When the ampoules are crushed between the fingers, formed channels direct the flow of the liquid reagents to wet the test spots. Each test spot or detecting tablet develops a distinctive color that indicates whether a chemical agent is present in the air. It is a gross-level detector.

Aircraft spot decontamination. Process of flushing contaminated aircraft surfaces required to be touched. This limits the transfer and spread of contamination while sustaining flight operations.

Aircraft washdown. A process similar to the vehicle washdown technique.

Amyl nitrite. A volatile liquid, that is inhaled to dilute blood vessels. At one time, amyl nitrite was issued to U.S. Forces as an antidote for blood agent poisoning.

ANBACIS. Automated Nuclear, Biological and Chemical Information System. A computer software system employed by the U.S. military to support chemical defense personnel and units.

Arsenical. A group of chemical agents containing arsenic. The main arsenical vesicants are lewisite (L), mustard-lewisite mixture (HL), and phenyldichloroarsine (PD).

Atropine. Used as an antidote for nerve agent poisoning. It inhibits the action of acetylcholine at the muscle junction by binding to acetylcholine receptors. Atropine is an alkaloid obtained from *Atropa belladonna*, the "deadly nightshade" plant.

Automatic Chemical Agent Alarm, M8A1. The M8A1 is a point sampling chemical agent alarm system, consisting of an M43A1 ion mobility detector unit and a M42 alarm unit. It uses an Alpha radiation Americium 241 source and requires an electrical power supply. The M8A1 is a gross-level alarm which detects only nerve agents.

Automatic Continuous Air Monitoring System (ACAMS). The ACAMS is an automated sampling and analysis system. It is a low-level detector. ACAMS uses solid sorbents for sample collection and temperature programmed capillary column gas chromatography for separation of compounds and detection using a flame photometric detector (FPD). A gas plasma display panel shows simultaneously the total of phosphorous and sulfur-based concentrations of agents present. The main objective of the instrument is to ensure the safety of personnel by means of air monitoring.

Autonomic nervous system. That part of the nervous system that governs involuntary functions, such as heart rate, reflexes, and breathing. It consists of the sympathetic and parasympathetic nervous systems.

Banana oil. Isoamyl acetate, a chemical used to test protective mask fit.

Basic skills decontamination. The immediate neutralization or removal of contamination from exposed portions of the skin. Each

individual must be able to perform this decontamination without supervision.

BDO. Battle dress overgarment. The BDO is a camouflage colored expendable two-piece overgarment consisting of one coat and one pair of trousers. The BDO offers protection against chemical agent vapors, liquid droplets, biological agents, toxins and radioactive particles.

BIDS. Biological Integrated Detection System. A biological detection developed and fielded by the U.S. Army. The primary function of the BIDS is to detect and identify large-scale biological attacks on the battlefield.

Biological agent. A microorganism that causes disease in man, plants, or animals or causes the deterioration of materiel.

Biological defense. The methods, plans, and procedures involved in establishing and executing defensive measures against attacks utilizing biological agents.

Biological operation. Employment of biological agents to produce casualties in man or animals and damage to plants or materiel; or defense against such employment.

Biological threat. A threat that consists of biological material planned to be deployed to produce casualties in personnel or animals and damage plants or other materiel.

Biological warfare (BW). The use, for military or terrorist purposes, of living organisms or materials derived from them, which are to cause disease in man, plants, or animals or causes the deterioration of materiel.

Biotechnology. Applied biological science; for example, genetic engineering and biofermentation processes.

Blister agent. A chemical agent that can cause blistering of the skin and extreme irritation of the eyes and lungs. Although primarily an incapacitant, it can cause death in large doses. Examples of a blister agent are mustard and lewisite. Also called vesicant agent.

Blood agent. A chemical compound including the cyanide group that affects bodily functions by preventing the normal transfer of oxygen from the blood to body tissues; also called cyanogen agent. Examples are hydrogen cyanide and cyanogen chloride.

Boots, butyl rubber. Foot coverings which prevent the penetration of liquid chemical agents. They also protect the foot area of the protective suit from excessive wear and tear.

Botulism. Poisoning by toxin derived from the microorganism clostridium botulinum.

Buddy aid. The administration of a chemical agent antidote to a person exhibiting symptoms of severe chemical agent poisoning when that person is unable to perform self-aid.

Butyl Rubber. A synthetic rubber prepared as the copolymer of butylene with isoprene and vulcanized to form a substance impermeable to gases. Used to make various items of the IPE ensemble.

BZ. 3-Quinuclidinyl Benzilate. A central nervous system depressant.

CAM. Chemical Agent Monitor, M1. The M1 CAM is a hand-held detector used for point source monitoring, not for ambient air sampling. It is a gross-level detector. CAM uses ion mobility spectrometry principles to respond selectively to agent vapors. CAM is used primarily during transportation of chemical agents and at personnel decontamination sites.

CANA. Convulsant antidote for nerve agents. A disposable device for intramuscular injection of diazepam to an individual who is incapacitated by nerve agent poisoning incident.

CANE. Combined Arms in a Nuclear/Chemical Environment.

CB. Chemical and biological.

CBIRF. USMC Chemical Biological Incident Response Force.

CDTF. Chemical Defense Training Facility. Located at the U.S. Army Chemical School, FT Leonard Wood, Missouri. This facility

provides a toxic environment for training soldiers to use and gain confidence in their chemical protective equipment, to include the protective mask.

Central nervous system. Consists of the brain and spinal cord. The CNS controls mental activity and voluntary muscular activity. It also coordinates the body's involuntary functions indirectly.

CG. Phosgene, a choking agent.

Chemical Agent. A chemical substance that is intended for use in military operations to kill, seriously injure, or incapacitate people through its physiological effects. Included are blood, nerve, choking, blister, and incapacitating agents.

Chemical agent casualty. A person who has been affected sufficiently by a chemical agent to prevent or seriously degrade his or her ability to carry out the mission.

Chemical agent symbol. The military code designation for a chemical agent. Normally, a combination of one to three letters or letter and number combinations. Should not be confused with the chemical formula.

Chemical ammunition. A type of ammunition, the filler of which is primarily a chemical agent.

Chemical contamination. The presence of a chemical agent on a person, object, or area. Contamination density of an agent is usually expressed either in milligrams or grams per square meter (mg/m^2, g/m^2) or in pounds per hectare (lb/ha). A hectare is 10,000 square meters.

Chemical defense. The methods, plans, and procedures associated with defensive measures against attacks utilizing chemical agents.

Chemical event. Chemical accidents resulting from (1) Nondeliberate events where safety is a primary concern or, (2) Deliberate events such as terrorism where security is a concern.

Chemical protective cover helmet. A brittle-coated protective cover for the personnel armor system ground troop (PASGT) helmet.

Choking Agent. Choking agents irritate the eyes and throat and, when inhaled, injure the respiratory tract. In extreme cases membranes swell, lungs become filled with liquid, and death results from lack of oxygen. These agents "choke" an unprotected person. Fatalities of this type are called "dryland drownings." Examples of choking agents are chlorine and phosgene.

Chlorine. A highly irritating chemical agent destructive to the mucous membranes of the respiratory system. Chlorine is a choking agent.

CK. Cyanogen chloride, a choking agent.

Collective protection. The use of shelters to provide a contamination-free environment for selected portions of the force such as command and control elements.

Collective protection shelter. A shelter, with filtered air, that provides a contamination-free working environment for selected personnel and which allows relief from continuous wear of MOPP gear.

Contaminate. To introduce an impurity. Clothing or equipment exposed to a chemical agent is said to be contaminated.

Contamination. The deposit and/or absorption of radioactive material or biological or chemical agents on and by structures, areas, personnel, or objects; food and/or water made unfit for human or animal consumption by the presence of environmental chemicals, radioactive elements, bacteria, or organisms; the byproduct of the growth of bacteria or organisms in the decomposing material (including the food substance itself), or waste, in food or water.

Contamination avoidance. Individual and/or unit measures taken to avoid or minimize NBC attacks and reduce the effects of NBC hazards. Passive contamination avoidance measures are

concealment, dispersion, deception, and use of cover to reduce the probability of the enemy using NBC weapons if they are employed. Active contamination-avoidance measures are contamination control; detection, identification, and marking of contaminated areas; issuance of contamination warnings; and relocation or rerouting to an uncontaminated area.

Contamination control. Procedures to avoid, reduce, remove, or render harmless, either temporarily or permanently, NBC contamination. The purpose of contamination control is to maintain or enhance the efficient conduct of military or civilian operations.

Concentration. The amount of an agent present in a unit volume. Usually expressed in milligrams per cubic meter (mg/m^3) of air.

Consequence Management. Those essential services and activities required to manage and mitigate problems resulting from disasters and catastrophes. Such services and activities may include transportation, communications, public works, and engineering, fire fighting, information sharing, mass care, resources support, health and medical services, urban search and rescue, hazardous materials, food and energy (DoD Directive 3025.15 - Paragraph E2.1.5.).

CPE. Collective protection equipment.

CPFC. Chemical protective footwear cover. U.S. Government issued, impermeable, butyl rubber overboots.

CPOG. Chemical protective overgarment. The CPOG is an expendable two-piece overgarment, green in color, consisting of one coat and a pair of trousers. The CPOG offers protection against chemical agent vapors, liquid droplets, biological agents, toxins and radioactive particles.

CPU. Chemical protective undergarment. A lightweight, two-piece undergarment made of a nonwoven fabric with activated charcoal. The CPU, intended to be worn under the standard military uniform, provides protection against all known chemical agent vapors and liquid droplets.

Crisis Management. Response measures or actions designed to identify, acquire, and plan the use of all resources needed to anticipate, prevent, or resolve a threat or an act of terrorism. It is primarily a law enforcement function, which focuses on the criminal aspects of the scene.

CS. U.S. riot control agent.

Ct. Vapor dosage.

Culture. A population of microorganisms grown in a medium.

Cumulative. Agents that the body cannot easily break down or neutralize and that accumulate in the body.

Cutaneous. Pertaining to the skin.

CWDD. Chemical Warfare Directional Detector, AN/KAS-1A. A passive stand-off shipboard detection system that uses a passive infrared imaging detector to remotely identify nerve agent clouds.

CX. Phosgene oxime, a choking agent.

Cyanosis. Blueness of the skin owing to insufficient oxygen in the blood.

Cytotoxin. Toxin that directly damages and kills the cell with which it makes contact.

Decon. Decontamination.

Decontaminant. A material such as STB or DS-2 used in decontamination.

Decontaminate. To break down, neutralize, or remove a chemical, biological, or radioactive material posing a threat to equipment or personnel.

Decontamination. The reduction of the contamination hazard by removal or neutralization of hazardous levels of NBC contamination on personnel, equipment or material. It consists of three techniques: immediate, operational and thorough decontamination.

Decontamination Apparatus (Sanator), M17. A power-driven, portable, lightweight decontamination system designed to draw water from any source and deliver it at high pressures and

temperatures. Used to wash equipment prior to the application of decontaminants and to rinse afterwards.

Deliberate decontamination. Operation/techniques intended to reduce contamination to a level at which personnel can perform their mission without wearing MOPP gear.

Detailed Aircraft decontamination. A process where techniques are applied to remove, neutralize, or reduce contamination from an aircraft to a negligible risk, to allow the removal of MOPP level and/or reduce it for extended periods. Different procedures and techniques are used for interior decontamination of an aircraft due to avionic equipment.

Detailed equipment decontamination (DED). Process of removing, neutralizing, or reducing contamination on interior and exterior surfaces of unit equipment to negligible risk levels to allow the removal of MOPP level and/or reduce it for extended periods.

Detailed troop decontamination. Process of decontaminating individual fighting equipment to negligible risk levels; removing contaminated MOPP gear including protective masks; decontaminating protective masks; and monitoring personnel equipment for decon effectiveness. This is done to remove and/or reduce MOPP levels for extended periods.

Detection. The act of locating NBC hazards by use of chemical detectors or monitoring/survey teams.

Detection kits/detectors. The detection kits used by the U.S. military are gross-level detectors. This means that they are only able to detect chemical agents in high concentrations. They can, however, detect vapors, aerosols, and liquid droplets. The level of skill needed to operate a detector kit is deemed to be low. These detection devices in use by the military are effective as screening devices to detect the presence of specific potentially toxic chemicals in bulk samples of complex matrices. The techniques used are reagent based chemistry. Most detection kits provide binary response to the presence of a chemical functionality, specific element or physical characteristic in the target analyte. The

responses are qualitative and highly selective with a minimum of false negatives. Two of the U.S. military detection kits are the M18A2 Agent Detector Kit and the M256A1 Agent Detector Kit. The U.S. military gross-level detectors are the M8A1 Automatic Chemical Agent Alarm and the Chemical Agent Monitor (CAM).

Detector paper. Specially treated paper used to determine the presence of liquid chemical agents. M8 and M9 paper are examples. M9 chemical agent detector paper is dispensed from a roll and has adhesive back. It is worn on clothing or attached to vehicles or equipment. When liquid chemical agent touches the paper, a pink, red, or purple spot appears. M8 chemical agent paper is issued in a book and carried by the individual to test suspected liquid contamination. When the M8 paper contacts liquid nerve or blister agents, it produces a specific color change to indicate presence of a chemical agent. Color codes are on the book cover.

Detoxification rate. Rate at which the body' s own actions overcome or neutralize (detoxify) chemicals or toxins. Agents that the body cannot easily break down and neutralize and that accumulate in the body are called "cumulative".

DKIE. Decontamination Kit, Individual Equipment, M280. Issued to the individual soldier to decontaminate the protective gloves, protective mask and hood, overboots, load-bearing equipment and weapon immediately after contamination by a liquid chemical agent. The M280 is scheduled to be replaced by the M291 Skin Decontamination Kit.

DM. Diphenylaminochloroarsine (Adamsite), a vomiting agent.

Dosage. Cumulative exposure equivalent to the concentration of chemical agent to which an individual is exposed integrated over the time of exposure.

Dose. Quantity of agent having entered the body.

DP. Diphosgene, a blood agent.

Dryland Drownings. See choking agents.

DS-2. Decontaminating solution #2. A U.S. military decontaminant. Available in 1-1/3-quart cans and in 5-gallon pails used for filling portable decontaminating apparatuses.

Edema. Excessive accumulation of fluid in body tissues or body cavities. A symptom of choking agent poisoning.

Emergency decon. See immediate decon.

EMP. Electromagnetic pulse.

EOD. Explosive ordnance disposal.

Filter. A component of the protective mask used to remove contaminants.

First aid. Any one-time treatment of minor injuries that do not ordinarily require medical care. Such one-time treatment, and follow-up visit for observation, or the use of (up to three) atropine sulfate auto-injectors (MK-1 nerve agent antidote kit), is considered first aid, even though provided by a physician or registered medical professional personnel.

Fit factor (FF). A quantitative measure of the fit of a protective mask. It is expressed as the radio of concentration outside the protective mask to the concentration inside the protective mask. For practical military use, this is the equal to the protection factor.

Fixed shelter. Collective protection, usually in a rear area in a permanent location, such as a building basement, bunker, or expandable rigid-wall, tactical shelter. Uses are field hospitals, operating rooms, maintenance shops, data processing centers, field kitchens, fire control centers, and supply storage areas.

Fox. The M93 NBC Reconnaissance System. Fox is the U.S. version of the German Army "SpurPanzer FUCHS."

G-series nerve agents. A series of nerve agents developed by Germany during the late 1930's and early 1940's. They include Tabun (GA), Sarin (GB), and Soman (GD).

GA. Tabun, a nerve agent.

GB. Sarin, a nerve agent.

GB2. A binary nerve agent.

Gloves, butyl rubber. Hand covers which prevent the penetration of liquid chemical agents. They are attached to OSHA Level A suits using clamps. They are not attached directly to Army Level A suits.

GVO/BVO. Green vinyl overboot/black vinyl overboot. U.S. Government issued plain vinyl overboot with elastic fasteners. Can be used to protect the wearer's from NBC agents, water, mud or snow.

H. Levinstein mustard, a blister agent.

H-series agents. A series of persistent blister agents, that include distilled mustard (HD) and the nitrogen mustards (HN-1, HN-2, and HN-3).

Harassing concentration. A concentration of an agent that requires masking or other protective measures. Such concentration may be insufficient to kill but sufficient to interfere with normal operations.

Hasty decontamination. Actions of teams or squads using equipment found within battalion-level military units to reduce the spread of contamination on people or equipment and allow temporary relief from MOPP4.

HCN. Hydrogen cyanide, a blood agent.

HD. Distilled mustard, a blister agent.

Heat Burden. The amount of psychological stress placed on a wearer of protective equipment, as a result of work rate and ambient temperature.

HEPA filter. High efficiency particulate air filter. A filter which removes from the air 99.97% or more of aerosols having a diameter of 0.3 micrometers.

Herbicide. A chemical compound that will kill or damage plants.

HL. Mustard-lewisite mixture.

HN. Nitrogen mustard (HN-1, HN-2, and HN-3).

HT. Mustard-T mixture.

HTH. Calcium hypochlorite, a decontaminant.

Hybrid collective protection. A combination of overpressure and ventilated-facepiece protective system. Normally found in armored combat vehicles.

Hydrolysis. Interaction of a chemical agent with water to yield a less toxic product or products.

Hydrolyze. To subject to hydrolysis; to split a chemical bond with water.

ICE. Individual chemical equipment: protective mask, hood, gloves, protective overgarment, decontamination kit and NBC first aid items.

Identification. Process of positively identifying field concentrations of blood, blister, and nerve agents, using detection equipment.

IDLH. Immediate Danger to Life and Health.

IED. Improvised explosive devices.

Immediate decontamination. Also called emergency decontamination. Immediate decontamination is carried out by individuals immediately upon becoming contaminated. It is performed in an effort to minimize casualties, save lives and limit the spread of contamination. There are three techniques: skin decontamination, personal wipedown, and operator's spraydown.

Incapacitate. Disable.

Incapacitating agent. An agent that produces temporary physiological or mental effects, or both, that will render individuals incapable of effective effort in the performance of their assigned duties.

Incapacitating dose. The concentration or dose of an agent that renders an individual unfit for duty or combat.

Individual protection. Actions taken by individual soldiers to survive and continue the mission under NBC conditions.

Industrial chemicals. Chemicals developed or manufactured for use in industrial operations or research by industry, government, or academia. These chemicals are not primarily manufactured for the specific purpose of producing human casualties or rendering equipment, facilities, or areas dangerous for use by man. Hydrogen cyanide, cyanogen chloride, phosgene, and chloropicrin are industrial chemicals that also can be military chemical agents.

Inflammation. Reaction of tissues to injury; characterized by pain, heat, redness, or swelling of the affected parts.

IPE. Individual protective equipment.

IPE Ensembles. The potentially hazardous nature of a chemical agent environment necessitates that individuals involved with handling or inspecting chemical weapons wear protective clothing or, at a minimum, carry a protective mask. The level of protection will vary depending on the conditions of the work area. Various systems are used to rate the degree of protection afforded by an IPE ensemble. In the United States, two rating systems are typically used: U.S. Army Levels A-F and the Occupational Safety and Health Administration (OSHA) Levels A-E.

L. Lewisite, an arsenical.

Lacrimator. A compound that causes a large flow of tears and irritates the skin.

Latent period. A period of apparent inactivity.

Lct_{50}. Median lethal dosage of a chemical agent vapor or aerosol.

LD_{50}. Median lethal dosage of a liquid chemical agent.

LDS. Lightweight Decontamination System, M17. The M17 is a portable pump and water heating unit designed for equipment and vehicle decontamination.

Lesion. Injury, a diseased area or pathological change in an organ or tissue.

Lethal. Deadly, fatal.

Lethal chemical agent. Chemical agents designed primarily to cause death to exposed personnel. Included are choking, nerve and blood agents.

Lethal dose. The amount of a toxic substance that has a fatal effect.

Limited mobile shelter. Collective protection that is not easily moved.

Mask. See protective mask.

Mask only. Protective posture that provides some relief from MOPP gear for personnel who must work in a contaminated environment. Personnel must be within protective shelters, some kinds of vans, tanks, or buildings where danger of transfer hazards is minimal. A soldier in "mask only" posture can tolerate exposure to vapor hazards but not transfer hazards. "Mask only" permits longer work periods, but personnel must assume full MOPP level before exiting their sheltered area.

Membrane. A thin layer of tissue that covers a surface or divides a space or organ.

Miniature Continuous Air Monitoring System (MINICAMS). The MINICAMS is an automatic monitoring and alarm system developed specifically for the detection of all common CW agents, simulants, and related compounds. It is a low-level detector. MINICAMS is based on sample collection using solid sorbents, separation using a temperature programmed capillary GC column, and detection using PID, FPD, or FID. A liquid crystal display panel shows simultaneously the total of phosphorous and sulfur based concentrations of any chemical agents present. The main objective of the instrument is to ensure the safety of personnel by means of air monitoring.

Miosis. Excessive contraction of the pupil of the eye. A symptom of nerve agent poisoning.

Mission Oriented Protective Posture (MOPP). A flexible system for protection against NBC contamination. This posture requires personnel to wear only that protective clothing and equipment (MOPP gear) appropriate to the threat level, work rate imposed by the mission, temperature, and humidity. There are five levels of MOPP (zero through four).

Mobile Mass Spectrometer. A rugged, transportable, toxic agent identification system for use in the field. It has been adopted for use, in different configurations, by both the U.S. and German military.

MOPP gear. Military term for individual protective equipment including suit, boots, gloves, mask with hood, first aid treatments, and decontamination kits issued to soldiers.

MOPP gear exchange. A systematic procedure utilized by the military to remove gross contamination from the individual soldier. Mask and hood are wiped down, and individual gear is brushed with decontaminant.

Mustard. A chemical agent that can cause blistering of the skin and extreme irritation of the eyes and lungs. Although primarily an incapacitant, it can cause death in large doses. Examples are distilled mustard (HD) and Levinstein mustard (H).

Mortality rate. The ratio of the number of deaths from a given disease to the total number of cases of that disease.

NAAK. Nerve agent antidote kit, Mark I. Nerve agent poisoning requires immediate first aid. Soldiers are issued three NAAKs for this purpose. The NAAK consists of one small autoinjector containing atropine and a second autoinjector containing pralidoxime chloride (2 Pam Chloride). A plastic clip holds the two injectors together.

NAPP. Nerve agent pretreatment pyridostigmine. NAPP is an adjunct to the NAAK. Pyridostigmine bromide enhances the effectiveness of the 2 Pam Chloride in the Mark I Kit against GD

(Soman). It is not a true pretreatment because it offers no protection from nerve agent itself.

NBC. Nuclear, biological, and chemical.

NBC capable nation. A nation that has the capability to produce and employ one or more types of NBC weapons across the full range of military operations and at any level of war in order to achieve political and military objectives.

NBC defense. This consists of measures which enable friendly forces to survive, fight, and win against enemy use of nuclear weapons, biological or chemical agents. U.S. forces apply NBC defensive measures before and during integrated warfare. In integrated warfare, opposing forces employ nonconventional weapons along with conventional weapons. NBC weapons are non-conventional.

NBC conditions. Combat where one or both combatants possess nonconventional weapons. The combatants may or may not have employed these weapons, but the capability exists. Under NBC conditions forces must take a full range of NBC defensive measures to counter possible enemy NBC attacks.

NBC-PC. NBC protective cover. A lightweight, low-cost, versatile cover designed to be used in the field to prevent liquid agent contamination of supplies and equipment.

NBCRS. NBC Reconnaissance System. See Fox.

Neat chemical agent. A nondiluted, full-strength (as manufactured) chemical agent.

Necrosis. Death of a cell or group of cells.

Necrotic. Capable of destroying living tissue.

Nerve agent. A lethal chemical that causes paralysis by interfering with the transmission of nerve impulse.

Neurotoxic. Poisonous to nerve tissue.

Neurotransmitters. Chemical substances released by neurons into the synapse and causing an effect on the postsynaptic cell. More than 50 compounds have been identified as neurotransmitters, including acetylcholine.

Neutralize. To render neutral.

NIOSH. National Institute of Occupational Safety and Health.

Non-injurious. Degree to which the effect on exposed humans is considered negligible for near and long-term risk.

Nonpersistent agent. A chemical agent that, when released, dissipates and/or loses its ability to cause casualties after the passage of a brief period of time (e.g. 10 to 15 minutes).

Operational decon. A tactical decontamination operation that consists of two techniques: the MOPP gear exchange and the vehicle washdown.

Operator's spraydown. Process of applying decontaminant onto unit equipment control surfaces to stop contamination from spreading, transferring, or soaking into surface.

Organophosphate. A phosphate-containing organic compound. Organphosphates inhibit cholinesterase enzymes. G-series and V-series nerve agents are organophosphates, as are certain common insecticides.

OSC. On-Scene Commander

OSHA. The Occupational Safety and Health Administration.

Overgarment. See IPE.

2-Pam chloride. 2-pralidoxime chloride. See NAAK.

Pathogen. A disease-producing microorganism.

Pathogenic. Causing disease.

PDDA. Power Driven Decontamination Apparatus, M12. Large, vehicle-mounted decontamination apparatus used by the U.S. Armed Forces.

PDDE. See power driven decontamination equipment.

Percutaneous. Through the skin. When applied to chemical agents, the term refers to the route of entry into the body.

Persistency. A measure of the duration for which a chemical agent is effective. This property is relative and varies by agent, method of dissemination and environmental conditions such as weather or terrain.

Personal wipedown. Process of removing or neutralizing contamination from the individuals' equipment, including the protective mask, hood, gloves, weapon, and helmet. This process will stop the spread, transfer, and penetration of contamination into the equipment surfaces.

Permeable. The presence of pores or small openings in materials which allow liquids or gases to penetrate.

Persistency. In biological or chemical warfare, the characteristics of an agent which pertains to the duration of its effectiveness under determined conditions after its dispersal.

Physostigmine. An alkaloid from the Calabar bean *Physostigma.* Physostigma salicylate is used to relieve symptoms of BZ and other gylcolate exposure.

Phytotoxin. A toxin derived from a plant.

Portable Decontaminating Apparatus. A small, easily transported decontamination device such as the U.S. military's M11 or M18. It is used to decontaminate the operating surfaces of vehicles or crew-served weapons.

Potable. Fit or suitable for drinking.

Power driven decontamination equipment (PDDE). Any of different types of pump and heater units capable of spraying water, heated water, or steam. Soap or decontaminants can also be mixed and sprayed through these units in most cases. They include, but are not limited to, the M12 Power Driven Decontamination

Apparatus (PDDA) and the M17 Lightweight Decontamination System (LDS).

Precursor. Any chemical reactant which takes part at any stage, or any method, of the production, of a toxic chemical. This includes any key component of a binary or multicomponent chemical system.

Protection. Measures taken to keep NBC hazards from having an adverse effect on personnel, equipment, or critical assets and facilities.

Protection factor (PF). The expected level of respiratory protection provided by a properly functioning mask to properly fitted and trained users. It is measured as a ratio of air concentration of a given contaminant outside of the mask to the concentration measured within the mask. For practical military use, protection factor equals fit factor.

Protective mask. A protective ensemble designed to keep the wearers from breathing air contaminated with chemical and/or biological agents.

PS. Chloropicrin, a vomiting agent.

Pulmonary. Pertaining to the lungs.

Pulmonary edema. The excessive accumulation of fluid in lung tissue.

Pyridostigmine Bromide (PB) tablets. See NAPP.

RCA. Riot control agent. Substances, usually having temporary effects, that are used typically for law enforcement purposes. An example is the tear-producing agent CS.

Reagent. A chemical that produces temporary irritating or disabling effects when in contact with the eyes or when inhaled.

Restoration operations. Measures taken to return personnel and units to a near-normal operating capability after an NBC attack.

RSCAAL. Remote Sensing Chemical Agent Alarm, M21. A passive infrared spectroradiometer that uses an on-board microprocessor to detect and identify chemical agent clouds.

Sanator. See Decontamination Apparatus, M17.

SBCCOM. Soldier and Biological Chemical Command

SCALP. Suit, contamination avoidance and liquid protection. A disposal, lightweight, impermeable, chemical protection suit designed to be worn over the BDO in order to protect it from gross liquid contamination. A secondary use of the SCALP is to protect decontamination personnel from being soaked during decontamination operations.

SCBA. Self-Contained Breathing Apparatus. See IPE ensembles.

SCPE. Simplified collective protection equipment, M20. The SCPE provides a clean-air shelter for use against chemical and biological agents.

SDK. Skin Decontamination Kit, M291. Carried by the individual for skin decontamination; to be used immediately after contamination by a liquid chemical agent. The M291 is the replacement for the M258A1 Individual Decontamination Kit.

Self-aid. Administration of a chemical agent antidote to oneself upon experiencing early symptoms of chemical agent poisoning.

Skin Decontamination Kit, M258A1. Carried by the individual soldier for skin decontamination; to be used immediately after contamination by a liquid chemical agent. The M258A1 is to be replaced by the M291 Skin Decontamination Kit.

Skin decon technique. Process of removing or neutralizing contamination on the skin within 1 minute of contamination. This is done to prevent it from penetrating the skin.

STB. Supertropical Bleach. Highly chlorinated, powdered decontaminating material used primarily by ground forces and shore facilities. STB is a standard U.S. military decontaminant.

Sternutator. Vomiting compound.

Stupor. Partial or nearly complete unconsciousness.

Survey. The directed effort to determine the location and the nature of chemical agent in an area.

Suspension. A mixture of the fine particles and a liquid. If the mixture is allowed to stand, the fine particles will settle.

Sympathetic nervous system. A network of nerves that trigger certain involuntary and automatic bodily functions, such as constricting blood vessels, widening the pupils, and speeding up the heartbeat.

Symptoms. Functional evidence of disease; a change in condition indicative of some mental or bodily state.

Systemic action. Action affecting many systems. It includes the movement of the agent through the organism and its effect on cells and processes remote from the point of application.

Tactics. The employment of units in combat. The ordered arrangement and maneuver of units in relation to each other and/or the enemy in order to use their potentialities.

TAP. Toxicological agent protective.

TAP apron. Toxicological agent protective apron. Normally worn over the protective overgarment. The TAP apron is intended for use by personnel whose duties may bring them in contact with liquid chemical agents. In tactical situations, it provides decontamination personnel added protection when conducting extended decontamination operations.

Terrorism. The unlawful use of force or violence against persons or property to intimidate or coerce a government, civilian population, or any segment thereof, in furtherance of political or social objectives, within the United States or its territories and resources.

TEU. U.S. Army Technical Escort Unit.

TGD. Thickened Soman, a nerve agent.

Thickened agent. An agent to which a polymer or plastic has been added to retard evaporation and cause it to adhere to surfaces.

Thorough decon. The procedure by which contamination is reduced to negligible risk levels. Thorough decontamination consists of two techniques: the detailed troop decon and detailed equipment/aircraft decon.

TREE. Transient radiation effects on electronics.

Threshold dose. The smallest amount of a toxic substance that can produce the first recognizable injuries (for example; irritation of skin or eyes, nose, or miosis).

Toxemia. A general poisoning or intoxication owing to absorption of products (toxins) of microorganisms formed at a local source of infection.

Toxic. Poisonous; effects ranging from harmful to lethal depending on the dose and resistance of the individual.

Toxicity. A measure of the harmful effect produced by a given substance on a living organism.

Toxin. Generally, any poisonous substance of microorganism, plant, or animal origin.

Training agent. A chemical agent used in training to enhance proficiency in operating under NBC conditions.

Unitary chemical munitions. Chemical munitions that are filled with a single lethal chemical agent. This agent requires no mixing or other preparation to make it effective.

USAMRICD. U.S. Army Research Institute of Chemical Defense.

USAMRIID. U.S. Army Research Institute of Infectious Diseases.

Urticant. A chemical substance which causes an immediate, severe, burning sensation when in contact with human tissue. Phosgene oxime (CX) is an urticant.

UV. Ultraviolet.

V-agents. Persistent, highly toxic nerve agents developed in the mid-1950's. They are absorbed primarily through the skin.

Vaccine. A preparation of killed or attenuated (weakened) infective or toxic agent used as an inoculation to produce active artificial immunity.

Vapor pressure. The pressure excited at any temperature by a vapor when a state of equilibrium has been reached between it and its liquid or solid state.

Vector. A carrier, especially the animal or intermediate host that carries a pathogen from one host to another, as the malaria-carrying mosquito.

Venom. Poisonous mixture of toxins and other natural chemicals produced by animals or insects.

Vehicle washdown. Technique used for flushing contamination off equipment surface to limit spreading and transferring contamination. This process will reduce amounts of contamination and speed weathering.

Vesicant. A chemical agent that can cause blistering of the skin and extreme irritation of the eyes and lungs. Although primarily an incapacitant, it can cause death in large doses. Also called blister agent.

VGH. Relating to V- and G-type nerve agents and H-type blister agents.

Virulence. Capability of a microorganism to produce disease.

VX. A persistent nerve agent.

WATCH. Warning Against Toxic Chemical Hazards. A data management and processing system developed by the U.S. Army to assist with command, control, communications, and information management during a chemical accident or incident.

WMD. Weapons of Mass Destruction. Weapons that through their use or threat of use can cause large-scale damage and

contamination, shifts in military objectives, phases or courses of action. NBC weapons are weapons of mass destruction.

Zootoxin. A toxin or poison of animal origin, such as the venom of snakes, spiders, etc.

Appendix B. Indicators

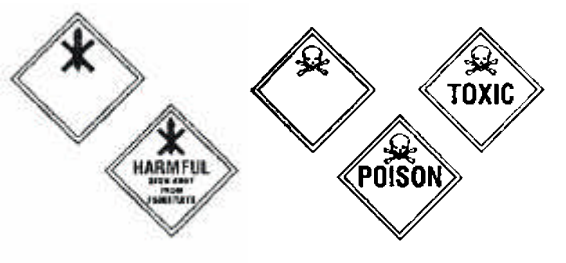
Indicators of a Possible Chemical Incident

Dead animals	Not just an occasional roadkill, but numerous animals (wild and domestic, small and large), birds and fish in the same area.
Lack of insect life	If normal insect activity (ground, air, and/or water) is missing, then check the ground/water surface/shore line for dead insects. If near water, check for dead fish/aquatic birds.
Physical Symptoms	Numerous individuals experiencing unexplained water-like blisters, wheals (like bee stings), pinpointed pupils, choking, respiratory ailments and/or rashes.
Mass casualties	Numerous individuals exhibiting unexplained serious health problems ranging from nausea to disorientation to difficulty in breathing to convulsions to death.
Definite pattern of casualties	Casualties distributed in a pattern that may be associated with possible agent dissemination methods.
Illness associated with confined geographic area	Lower attack rates for people working indoors versus outdoors, or outdoors versus indoors.
Unusual liquid droplets	Numerous surfaces exhibit oily droplets/film; numerous water surfaces have an oily film. (No recent rain.)
Areas that look different in appearance	Not just a patch of dead weeds, but trees, shrubs, bushes, food crops, and/or lawns that are dead, discolored, or withered. (No current drought.)
Unexplained odors	Smells may range from fruity to flowery to sharp/pungent to garlic/horseradish-like to bitter almonds/peach kernels to new mown hay. It is important to note that the particular odor is completely out of character with its surroundings.
Low-lying clouds	Low-lying cloud/fog-like condition that is not explained by its surroundings.
Unusual metal debris	Unexplained bomb/munitions-like material, especially if it contains a liquid.(No recent rain.)

Placards Associated with Chemical Incidents

Gases-Toxic and/or Corrosive

Substances-Toxic (Non-Combustible)
Substances-Toxic (Combustible)



Indicators of a Possible Biological Incident

Unusual numbers, of sick or dying people or animals	Any number of symptoms may occur. As a first responder, strong consideration should be given to calling local hospitals to see if additional causalities with similar symptoms have been observed. Casualties may occur hours to days to weeks after an incident has occurred. The time required before symptoms are observed is dependent on the agent used and the dose received. Additional symptoms likely to occur include unexplained gastrointestinal illnesses and upper respiratory problems similar to flu/colds.
Unscheduled and unusual spray being disseminated	Especially if outdoors during periods of darkness.
Abandoned spray devices	Devices will have no distinct odors.
Unusual numbers, of sick or dying people or animals	Any number of symptoms may occur. As a first responder, strong consideration should be given to calling local hospitals to see if additional causalities with similar symptoms have been observed. Casualties may occur hours to days to weeks after an incident has occurred. The time required before symptoms are observed is dependent on the agent used and the dose received. Additional symptoms likely to occur include unexplained gastrointestinal illnesses and upper respiratory problems similar to flu/colds.
Unscheduled and unusual spray being disseminated	Especially if outdoors during periods of darkness.
Abandoned spray devices	Devices will have no distinct odors.

Placard Associated with Biological Incidents

Infectious Substances

Indicators of a Possible Radiological Incident

Unusual numbers, of sick or dying people or animals	As a first responder, strong consideration should be given to calling local hospitals to see if additional casualties with similar symptoms have been observed. Casualties may occur hours to days or weeks after an incident has occurred. The time required before symptoms are observed is dependent on the radioactive material used and the dose received. Additional symptoms include skin reddening and, in severe cases, vomiting.
Unusual metal debris	Unexplained bomb/munitions-like material.
Radiation Symbols	Containers may display a radiation symbol.
Heat Emitting Material	Material that seems to emit heat without any sign of a external heating source.
Glowing material/particles	If the material is strongly radioactive, then it may emit a radioluminescence.

Placards Associated with Radiological Incidents

Radioactive Materials

Appendix C. WMD Information Resources

AFRRI	www.afrri.usuhs.mil
American Red Cross	www.redcross.org
Analytic Services (ANSER)	www.anser.org/homeland/
Army Medical Department Center	www.armymedicine.army.mil
CBIAC	www.cbiac.apgea.army.mil
CBIRF	www.cbirf.usmc.mil
Centers for Disease Control	www.cdc.gov
Chemical and Biological Weapons Chronicle	www.stimson.org
Chemical Warfare and Chemical Warfare Protection	
Defense Threat Reduction Agency	www.dtra.mil
Disaster Recovery Journal	www.drj.com
DoD Emergency Information Infrastructure Partnership	www.defenselink.mil
EPA	www.epa.gov
ERDEC	www.sbccom.apgea.army.mil/RDA/
FEMA	www.fema.gov
FBI	www.fbi.gov
National Domestic Prepardeness Office (NDPO)	www.fbi.gov/programs/ndpo
Emergency Responders	www.fireweb.com
Int'l Association of Fire Chiefs	www.iafc.org
Int'l Association of Fire Fighters	www.iaff.org

Joint Service Tech Base Planning for CB Defense	www.techbase.tasc.com
JSCBIS	www.sarda.army.mil/jscbis/jscbis
JWARN	www.atsc.army.mil
Medical Chemical and Biological Defense	mrmc-www.army.mil
National Fire Protection Assoc.	www.nfpa.org
National Guard Bureau	www.ngb.dtic.mil
NBC Medical Defense Information Server	www.nbc-med.org
NMRI	www.nmri.nnmc.navy.mil
SBCCOM	www.sbccom.apgea.army.mil
Technical Escort Unit	http://teu.sloccom.army.mil
USAMRICD	chemdef.apgea.army.mil
USAMRIID	www.usamriid.army.mil

Appendix D. Sample 911 Operator Checklist for Chemical/Biological Incident Reporting

1. Location of the incident
2. Approximate time of the incident
3. Is anyone injured or sick? How many?
4. Is there a fire or explosion?
5. Is there a vehicle or container involved?
6. Has anything been spilled or released?
7. Is there smoke or a vapor cloud?
8. Do/did you hear any sounds like hissing or a burst?
9. Do/did you smell an unusual odor?
10. What are the local weather conditions? Sunny, rain, cloudy, sleet, snow?
11. Is there anyone at the scene that may have knowledge of the situation? Provide name and telephone number.
12. At what location can the responding units meet with the person reporting the incident or that has knowledge about the incident?