A. **Purpose:**

This policy provides a basic overview of Terrorism. The policy is designed to assist Departmental personnel in identifying a possible terrorist/WMD incident and implementing initial actions. This policy and associated Operational Plans, provides both strategic and tactical considerations that should be assessed within the first hour of an incident. This document is to be used as a source document and will provide the basis for the development and implementation of Operational Plans necessary to provide a safe and effective response.

B. **Policy:**

It is the policy of this Department to use all appropriate means to deter, defeat, and respond to all terrorist attacks committed against our people and facilities wherever and whenever they occur.

C. **Overview**

1. **WMD/NBC Review**

   a. The Defense Against Weapons of Mass Destruction Act refers to weapons of mass destruction (WMD) as chemical, biological, or radiological agents or materials that have the capability to cause death or serious injury to a significant number of people through the release, dissemination, or impact
of such agents or materials. Response requirements differ for each NBC agent or material. Chemical agents require a traditional hazardous material (HAZMAT) type response with specialized equipment and pharmaceuticals. Biological agents require a response by the medical community similar to an epidemiologic response. It is unlikely that HAZMAT/Emergency Medical Services (EMS) responders would be called upon to respond to the consequences of a biological agent release. Radiation is an invisible hazard requiring specialized detection instruments. HAZMAT/EMS responders should make appropriate measurements/surveys with radiological detection equipment to determine the presence of a radiation hazard.

b. Local Response Requirements for a Terrorist WMD Incident

1) Despite a massive Federal effort to prepare for and manage the consequences of domestic nuclear, biological, and chemical (NBC) terrorism, a terrorist WMD incident response is dependent upon responders at the local level for initial emergency response requirements. It is unlikely that Federal resources will be available at the local level before 6 to 24 hours from the reported terrorist WMD incident. It is therefore prudent that this Department prepare for the eventuality of a terrorist WMD incident response. This Policy is designed to assist officers in their responsibilities regarding an effective response to the consequences of a terrorist WMD incident.

D. Procedure (Operational Plans #19, #24, #27, and #36)

1. Responding to Terrorist Incidents Involving WMD/NBC

   a. Indication of a Terrorist Incident Involving WMD/NBC

      1) NBC/WMD deployed in a civilian setting can include CIB warfare agents, the intentional release of industrial chemicals, or the release or explosion of nuclear or radiological materials. While each particular agent has its own unique signature and consequences, general outward warning signs or indicators include:

         a) Explosions that disperse or dispense liquids, mists, vapors, or gas.

         b) Explosions that seem to only destroy a package or bomb device.
c) Unscheduled and unusual dissemination of aerosol sprays.

d) Abandoned spray devices.

e) Numerous dead animals, fish, or birds.

f) Lack (or unusual abundance) of insect life.

g) Mass casualties without obvious trauma.

h) Definite pattern of casualties and common symptoms.

i) Civilian panic in potential high-profile target areas (e.g., Government buildings, mass transit systems, sports arenas, etc.).

b. Initial Actions by Dispatch Personnel

1) Dispatch personnel play a key role in mobilizing the proper response and support to a WMD incident.

2) Dispatchers must be aware of potential target locations and the indicators of possible criminal or terrorist activity involving NBC agents.

3) Dispatchers must know the indicators, signs, and symptoms of exposure to NBC agents and recognize unusual trends or patterns of activity indicative of a possible NBC incident.

4) Dispatchers should make the proper notifications that are required to other responding agencies and should understand how WMD/NBC incidents will develop within the Incident Command System (ICS).

c. Initial Actions by First Responding Officers

1). Initially, first responding units must isolate the area, deny entry, control egress of victims, and provide a response information update:

a) Observed NBC indicators.
b) Wind direction and weather conditions at scene.

c) Number of apparent victims.

d) Type of injuries; symptoms presented.

e) Nature of NBC agents (if known) from detection equipment or monitors.

f) Initial scene control perimeter and command post locations.

g) Suggested safe access route and staging area.

2) Next, first responding units should:

a) Request appropriate specialized resources such as HAZMAT teams, etc.

b) Don appropriate Personal Protective Equipment (PPE).

c) Identify the source of contamination, immediately isolate the area 1,500 feet in all directions, and designate zones of operation (Hot, Warm, and Cold). Consider weather effects during zone designation.

d) Establish a "safe refuge" area within the Warm Zone for victims who can self-relocate.

e) Provide emergency decontamination for victims who are outside the Hot Zone. Use a solution of 0.5-percent bleach (a 10:1 dilution) (HAZMAT responsibility).

f) Initiate protective actions (evacuation or shelter in place), as needed, for the community.

E. Chemical Agents

1. Indicators

a. The threat of chemical terrorism includes the intentional release of industrial agents, as well as the deliberate use of weapons of warfare. Chemical Warfare (CW) agents can be introduced via aerosol devices (munitions, sprayers, or aerosol generators); breaking containers; or covert
dissemination. General indicators of possible chemical agent usage include:

1) Unusual Dead or Dying Animals (e.g., lack of insects)
2) Unexplained Casualties
3) Multiple victims
4) Serious illnesses
5) Nausea, disorientation, difficulty breathing, or convulsions
6) Definite casualty patterns
7) Unusual Liquid, Spray, or Vapor
   a) Droplets; oily film
   b) Unexplained odor
   c) Low-lying clouds/fog unrelated to weather
8) Suspicious Devices/Packages
   a) Unusual metal debris
   b) Abandoned spray devices
   c) Unexplained munitions

2. Description
   a. Chemical agents include both persistent and non-persistent agents. Persistent agents (vapor, liquid, or dust) remain in the affected area for hours, days, or weeks. Non-persistent agents (primarily vapors) remain a hazard in the affected area for a shorter time period, usually minutes to hours.

   1) Nerve Agents affect the transmission of nerve impulses by reacting with the enzyme cholinesterase, which permits an accumulation of acetylcholine and continuous muscle stimulation. Generally, these agents are liquids, clear to light brown in color, and tasteless.
2) These agents can be absorbed through the skin, eyes, or respiratory or gastrointestinal tracts. Nerve agents are organophosphates and include "G" series agents - Tabun (GA), Sarin (GB), Soman (GD), and GF, as well as VX series agents. G series agents are non-persistent, primarily a hazard to the respiratory tract, and are characterized by a very rapid rate of action. VX series agents are very rapid in terms of rate of action, persistence (days to months), and have a consistency similar to motor oil. Their primary hazard involves direct contact to the skin or respiratory system from vapors.

The following descriptors characterize both the G and v x series agents:

<table>
<thead>
<tr>
<th>Agent</th>
<th>Odor</th>
<th>Color (@20° C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GA</td>
<td>None (pure) to fruity</td>
<td>Colorless to Brown Liquid</td>
</tr>
<tr>
<td>GB</td>
<td>Almost none when pure</td>
<td>Colorless Liquid</td>
</tr>
<tr>
<td>GD</td>
<td>Fruity; camphor (unpure)</td>
<td>Colorless Liquid</td>
</tr>
<tr>
<td>GF</td>
<td>Sweet, musty; peaches; shellac</td>
<td>Colorless Liquid</td>
</tr>
<tr>
<td>VX</td>
<td>None</td>
<td>Colorless to Amber Liquid</td>
</tr>
</tbody>
</table>

3) **Choking Agents** irritate the alveoli in the lungs, which stimulates the secretion of fluids that results in pulmonary edema. Principal agents of this type are phosgene (CG) and diphosgene (DP). They are generally non-persistent and are primarily a respiratory hazard. Phosgene is a colorless gas, while diphosgene is a colorless liquid. Both have the odor of new mown hay, freshly cut grass, or green corn. Initial symptoms include tearing, dry throat, tightness of chest, coughing, nausea, vomiting, headache, and an initial slowing of the pulse followed by an increase. Advanced symptoms include rapid, shallow breathing; painful cough; cyanosis; coughing of frothy sputum (severe); convulsions; a shock-like state; and pulmonary edema.

4) **Blood Agents** are CW agents that act upon the enzyme cytochrome oxidase and target the respiratory system of the blood, inhibiting the transfer of oxygen among cells. They include hydrogen cyanide (AC), cyanogen chloride (CK), and arsine (SA). They are considered non-persistent and colorless. Their primary hazard is respiratory in nature. AC has a faint odor resembling bitter almonds or peach kernels and is very rapid in terms of rate of action. CK has a pungent biting odor that can go unnoticed, and has a rapid rate of action. SA has a delayed rate of action (2 to 11...
hours) and a mild garlic odor. Initial symptoms include headache and euphoria (or giddiness); acute tachypnea for AC; or immediate intense irritation of the nose, throat, and eyes; along with decreased rate of breathing and tightness of the chest for CK. Advanced symptoms include violent convulsions.

5) **Blister Agents** include mustards (H, HD [sulfur mustard]; HN-1, HN-2, and HN-3, [nitrogen mustard]; HT; arsenicals [Lewisite], etc.; and urticants [CX]). Persistency of mustards ranges from a day to several months; while arsenical and urticant persistency is short. Mustards tend to have a delayed rate of action; while arsenicals and urticants have immediate impact. Blister agents initially cause irritation of the eyes and respiratory tract, reddening of the skin, followed by blistering and then systemic poisoning.

6) **Incapacitating Agents** cause physiological or mental effects leading to temporary disability lasting from hours to days past exposure. These agents include central nervous system (CNS) depressants such as BZ or stimulants, including LSD.

7) **Vomiting Agents** irritate the upper respiratory tract triggering involuntary vomiting. They are usually dispersed by heat as fine particulate smoke and have short persistency. They are fast acting respiratory hazards.

8) **Irritant or Tear Agents** are chemical agents (often used in riot control situations) that stimulate tearing, temporary eye discomfort, and irritation to the skin. They have an immediate rate of action and are primarily a respiratory hazard with a short persistency.

3. First Responder Concerns
   a. Treat all incidents involving chemical agents as intentional HAZMAT situations. Whenever it is believed that a chemical agent has been released, assume that all personnel and property have been potentially contaminated within the release area.
   b. The possible mixing of chemical agents, or mixing of industrial agents, is an additional concern since mixtures complicate the symptom-based identification of agents used.

4. Signs and Symptoms
Symptoms indicative of nerve agent exposure include:

1) **Initial.** Dimness of vision; miosis (constricted pupils); marked pinpointing of pupils (immediately upon exposure to vapor or aerosol; absent or delayed if absorbed through skin or ingested); runny nose; and localized sweating.

2) **Advanced.** Tightness in chest; difficulty breathing; nausea and vomiting; involuntary twitching and jerking; frontal headaches; convulsions; and coma.

3) After exposure to chemical agents, victims may present one or more of the symptoms described by the acronym SLUDGE (Salivation, Lacrimation, Urination, Diarrhea, Gastrointestinal, and Emesis).

4) Determining from signs and symptoms alone that a victim has been exposed to a chemical agent can be difficult for a first responder. In general, at least two signs or symptoms should be present to limit the risk of mistaking exposure to less toxic substances with exposure to chemical agents.

5) Protection from chemical agents requires full respiratory and skin protection. Your turnout gear, properly worn, will provide you with some protection.

6) Nerve agent antidotes are available and decontamination will work if you get the liquid chemical agent off your skin quickly. Flushing with water is likely the most expedient and widely available decontamination process.

7) Nerve agents are heavier than air. The G agents are fairly non-persistent, but VX is very persistent.

8) Clothing contaminated with nerve agents can "off gas," creating a problem for individuals around undecontaminated clothing who are unprotected.

9) Without advance warning, first responders may not recognize the existence of a chemical agent attack. Responders should also be alert for secondary devices that may be initiated after their arrival on scene, either by booby traps or remotely triggered.
10) Immediately request specialized resources such as HAZMAT teams and the U.S. Army Technical Escort Unit (TEU) to identify the exact nature of the chemical agent.

F. Biological Agents

1. Indicators

   a. It is unlikely that HAZMAT/EMS responders would be called upon to respond to the consequences of a biological agent release. However, responders should be familiar with biological agent characteristics. Biological agents have the potential to be more lethal than chemical agents and are primarily deployed through aerosol spray or by introduction into a water system. General indicators of possible biological agent usage include:

   1) **Unusual Dead or Dying Animals/Fish**

   2) **Unusual Casualties**

      a) Unusual illness for region/area

      b) Definite pattern inconsistent with natural disease

   3) **Unusual Liquid, Spray, or Vapor**

      a) Spraying and suspicious devices or packages

      b) Unusual swarms of insects

2. Description.

   Biological agents include pathogens that are living, reproducing, disease-producing organisms; toxins that are non-living poisons derived from living organisms; and EBRs that are chemical substances produced in the body to regulate bodily functions.

   a. Pathogens

      1) Bacteria such as anthrax, tularemia, bubonic plague, etc. Bacteria are capable of reproducing outside of living cells-

      2) Viruses such as yellow fever, smallpox, HIV, ebola, or marburg.
Viruses are infective agents composed of DNA or RNA that can only reproduce inside living cells.

3) Rickettsia such as Q fever and Rocky Mountain spotted fever. These are parasitic microorganisms that naturally transmit diseases through the bites of fleas, ticks, etc. These parasites require a living host.

4) Additional pathogens include yeasts and fungi as well as genetically engineered pathogens.

b. **Toxins** are non-living poisonous chemical compounds derived from living organisms. They include ricin, BTX, and saxitoxin. Toxins are thousands of times more lethal than standard chemical agents.

c. **Endogenous Biological Regulators (EBRs)** include hormones, adrenalin, and peptides.

3. Symptoms

a. The unusual or atypical presence of swarms of insects may be indicative of a biological agent attack with the insects serving as the delivery vector.

b. Unlike victims of exposure to chemical or radiological agents, victims of biological agent attack are not in and of themselves contaminated or contagious; however, they may serve as carriers of the disease.

c. Unlike chemical agents, exposure to biological agents may not be immediately apparent, with casualties occurring hours, days, or weeks after exposure. In many cases, the first indication of a biological agent attack may occur after a number of unusual illnesses begin to appear in local hospital emergency departments.

4. First Responder Concerns

a. The most practical method of initiating a biological agent attack is through the dispersal of aerosol particles. Biological agents may be able to enter the body through the respiratory tract, ingestion, or direct contact with skin or membranes. Without advance warning, first responders may not recognize the existence of a biological agent attack.

b. Treat all incidents involving biological agents as intentional HAZMAT situations. Whenever it is believed that a biological agent has been
released, assume that all personnel and property have been contaminated in the release area.

c. Immediately request specialized resources such as public health officials at the County, State, or Federal levels, along with experts such as the Centers for Disease Control and Prevention (CDC) and the U.S. Army Medical Research Institute for Infectious Diseases (USAMRIID) to identify the exact nature of the biological agent.

G. Radiological Materials

1. General.

   a. Radiation is defined as high-energy particles or gamma rays that are emitted by an atom as the substance undergoes radioactive decay, which is the process in which a radioactive nucleus emits radiation and changes to a different isotope or element. The types of radiation are in the following forms of energetic particles:

   1) Alpha particles
   2) Beta particles
   3) Photons (gamma rays and x-rays)
   4) Neutrons

   b. Particles lose their energy by depositing it in the material they move through, whether that material is air, water, people, or lead. Alpha particles deposit all their energy in a very short distance; very little protective material is required from alpha particles. Beta particles require slightly more shielding; gamma rays and x-rays require much more shielding. Neutrons react with matter differently than do most other kinds of radiation. They are more easily "stopped" by materials with low atomic numbers or "low Z materials" like carbon, lithium, or water. Radiation, regardless of intensity, has the potential to produce harmful effects on human beings. Background (natural) radiation poses little threat to our systems; however, serious health consequences can be expected if a person is subjected to large amounts of radiation.

2. Description/Symptoms. The types of radiation and their effects are as follows.

   a. **ALPHA** (particulate) radiation particles cannot penetrate the outer layer of
skin. They can be stopped by thin layers of light materials, such as a sheet of paper, and pose no direct or external radiation threat; however, they pose a serious health threat if ingested. Since the largest threat is inhalation, protective clothing is not required; however, a respirator or the use of a Self-Contained Breathing Apparatus (SCBA) is recommended. The range in air for alpha particles is 1 to 3 centimeters.

b. **BETA** (particulate) radiation particles can penetrate skin, but not vital organs (e.g., lungs, gastrointestinal tract, heart, etc.) and represent a hazard both internally and externally. Beta radiation can be lethal depending upon the dose and length of time of exposure. It is easily shielded by aluminum. The range in air for beta particles is approximately 10 feet. Initial symptoms are itching and burning of the skin with later symptoms that include reddening of the skin and changes in pigmentation, epilation, and sores.

c. **GAMMA** (energy) and **NEUTRON** radiation particles can penetrate through the body and represent a hazard both internally and externally. These rays have high energy and a short wavelength. Shielding against gamma radiation requires thick layers of dense materials, such as lead. Gamma and neutron radiation typically have a range in air of several hundred feet.

3. First Responder Concerns

a. The problem with radiation is that it is an invisible hazard. Unless the responding public safety agency has radiological detection equipment, or the nuclear material at issue is clearly marked and identified, there is a strong chance that the initial identification of a radiological or nuclear hazard will go unnoticed. Additionally, there is no one piece of equipment available on the market to meet all detection requirements; however, there are separate detectors for each type of radiation. An additional concern would be the availability of protective clothing and breathing gear, in sufficient quantities, to protect first responders.

b. Radiation, regardless of intensity, has the potential to produce harmful effects on humans, animals, and plant life. When first responders are subjected to large amounts of radiation due to major radiation accidents or nuclear attack, they can expect serious consequences to their health. Radiation sickness is similar to any other illness in the body. The "disease" is just radiation. *It should be noted that individuals suffering from radiation injuries are NOT radioactive!!*
1) Of importance is the dose or amount of radiation absorbed over a period of time. There are many terms used to measure a dose of radiation; one is the roentgen man equivalent (rem), which is a unit of absorbed dose that takes into account the relative effectiveness of the radiation involved in causing health effects. Another measurement of the absorbed dose of radiation is known as rad, though it is being replaced by a measurement known as Gray, which is the equivalent of 100 rad. In this document, health effects are expressed in rad.

2) 50 to 200 rad-Approximately 6 hours after exposure, the individual may have symptoms ranging from none to transient mild headaches. There may be a slight decrease in the ability to conduct normal activities. Less than 5 percent of individuals in the upper part of the exposure range will require hospitalization. Average hospital stay will be 45 to 60 days, with no deaths.

3) 200 to 500 rad-Approximately 4 to 6 hours after exposure, individuals will experience headaches, malaise, nausea, and vomiting. Symptoms are not relieved by antiemetics in the upper exposure range. Individuals can perform routine tasks, but any activity requiring moderate to heavy exertion will be hampered for 6 to 20 hours. After this period, individuals will appear to recover and enter a latent period of 17 to 21 days. If individuals have received 300 rads or more, they will have large quantities of hair loss between 12 to 18 days after exposure. Following the latent stage, symptoms will return, requiring 90 percent of the personnel to be hospitalized for 60 to 90 days. Probably less than 5 percent of those at the lower dose range will die, the percentage increasing toward the upper end of the dose range.

4) 500 to 1,000 rad-Approximately 1 to 4 hours after exposure, severe and prolonged nausea and vomiting will develop that are difficult to control. Diarrhea and fever develop early in individuals in the upper part of the exposure range. Significant incapacitation is seen in the upper ranges. Initial symptoms last for more than 24 hours, then go into a latent period lasting 7 to 10 days. Following the latent stage, the symptoms return requiring 100 percent of the individuals to be hospitalized. Of those in the lower range, 50 percent will die, the percentage increasing toward the upper range. All deaths occur within 45 days. The survivors require 90 to 120 days of hospitalization before recovery.
5) 1,000 rad or more—Less than 1 hour after exposure, individuals develop severe vomiting, diarrhea, and prostration. There is no latent period. All individuals require hospitalization and die within 30 days.

H. PLANNING CONSIDERATIONS

1. Threat of Terrorism
   a. The threat of terrorism affects all communities both nationally and internationally. History has shown that no community is immune. Terrorism transcends all geographic and demographic boundaries. All jurisdictions—suburban, urban, and rural areas at risk. It is important to note that terrorists have demonstrated a variety of attack methods and unpredictability in target selection. A visibly secure target may cause terrorists to change their focus to an alternate target. Additionally, a civil jurisdiction may become directly threatened as a result of its proximity to a target facility such as an airport. The threat to the public and to public safety agencies responding to incidents involving weapons of mass destruction (WMD) is very real. It is no longer a question of "if it happens," since it already has. The real question is when and where the next incident will occur. A general guideline in considering vulnerability for a terrorist attack involving WMD is to "never underestimate either the intelligence or the perseverance of the terrorist."

2. HAZMAT Terrorist WMD Incident Considerations
   a) An NBC terrorist incident is, inherently, a hazardous materials (HAZMAT) incident. **There are, however, significant differences between the two types of incident that influence response planning, organization, training, equipment, operational procedures, and coordination requirements.** A terrorist WMD incident may be characterized by:

   1) The use of WMD designed to inflict **mass casualties**.
   2) The **high lethality** of chemical or biological (C/B) agents.
   3) The **extremely toxic environment** resulting from NBC WMD.
   4) The relative ease and inexpensive manner for NBC WMD production.
5) The initial ambiguity in determining what type of NBC weapon or agent is involved, or, in the case of biological agents, if a terrorist incident has occurred.

6) The potential for a combination of weapons/agents each presenting different response requirements (i.e., explosives and chemical agents or simultaneous explosives, chemical agents, and radioactive material dispersal).

7) The narrow window-of-response time to administer lifesaving antidotes for chemical agents and antibiotics for biological agents.

8) The NEED for immediate medical treatment for mass casualties.

9) The NEED for immediately available specialized pharmaceuticals.

10) The NEED for specialized NBC detection equipment (HAZMAT responsibility).

11) The NEED for a timely, efficient, and effective mass decontamination system (HAZMAT responsibility).

12) The NEED for an organized, trained, and equipped HAZMAT/Emergency Medical Services (EMS) unit to immediately augment the local law enforcement response.

13) The NEED for pre-coordination with hospitals and medical treatment centers to establish medical treatment protocols, stock appropriate pharmaceuticals, and determine treatment procedure requirements.

14) The NEED to accomplish advance planning and coordination to respond to each of the NEEDS identified above.

I. The U.S. Government Policy on Terrorism

It is the policy of the United States to use all appropriate means to deter, defeat, and respond to all terrorist attacks on our territory and resources, both people and facilities, wherever they occur. (Presidential Decision Directive [PDD]-39)

Terrorism is defined as the unlawful use of force or violence committed by a group of individuals against persons or property to intimidate or coerce a government or the civil population in furtherance of political or social objectives. (Federal Bureau of
Investigation [FBI])

**Weapons of mass destruction (WMD) are defined as** any destructive device, explosive, incendiary, or poison gas, bomb, grenade, rocket, missile, or mine involving a disease organism, or any weapon designed to release radiation or radioactivity at a level danger to human life. (Title 18 U.S. Code) The Defense Against Weapons of Mass Destruction Act of 1996 (Title XIII, Section 1303) further defines WMD. **The term "weapons of mass destruction" means any weapon or device that is intended, or has the capability, to cause death or serious bodily injury to a significant number of people through the release, dissemination, or impact of:**

- Toxic or poisonous chemicals or their precursors.
- Disease organism.
- Radiation or radioactivity.

**J. Points to Remember**

1. Be aware of potential terrorist targets.

2. Nerve, blood, blister, and choking agents are heavier than air except hydrogen cyanide.

3. The respiratory tract and eyes are particularly susceptible to chemical agent exposure. Pinpoint pupils, dimness of vision, pain above the eyes, and tightness in chest are signs/symptoms of nerve agent exposure.

4. The immediate and ongoing use of Self-Contained Breathing Apparatus (SCBA) (with minimal skin protection) will ensure survivability in a vapor hazardous environment.

5. An incident involving a chemical agent is still a hazardous materials (HAZMAT) incident.

6. Remember, a terrorist-related incident is a crime scene. Coordinate activities with law enforcement officers in the interest of safety, security, and preservation of evidence.

7. Coordinate/manage requested/not requested outside resources.

**K. Definitions:**

**Absorption.** The process of an agent being taken in by a surface (e.g., clothing, fabrics, wood,
etc.) much like a sponge and water.

**Actual Breakthrough Time.** The average time elapsed between initial contact of the chemical with the outside surface of the fabric and the detection time.

**Acetylcholine.** A chemical compound formed from an acid and an alcohol that causes muscles to contact (neurotransmitter). It is found in various organs and tissues of the body. It is rapidly broken down by an enzyme, cholinesterase.

**Acetylcholinesterase.** An enzyme that hydrolyses the neurotransmitter acetylcholine. The action of this enzyme is inhibited by nerve agents.

**Adsorption.** The process of an agent sticking to or becoming chemically attached to a surface.

**Aerosol.** Fine liquid or solid particles suspended in air; for example, fog or smoke.

**Agent Dosage.** The concentration of a toxic vapor in the air multiplied by the time that the concentration is present.

**Antibiotic.** A substance that inhibits the growth of or kills microorganisms.

**Anticholinergic.** An agent or chemical that blocks or impedes the action of acetylcholine, such as the (also cholinolytic) antidote atropine.

**Anticholinesterase.** A substance that blocks the action of cholinesterase (acetylcho- linesterase) such as nerve agents.

**Antidote.** A substance that neutralizes toxic agents or their effects. Antisera. A liquid part of blood containing antibodies.

**Arsenical.** Pertaining to or containing arsenic; a reference to the vesicant lewisite. Atropine. (1) A medication used as an antidote for nerve agents. (2) An anticholinergic used as an antidote for nerve agents to counteract excessive amounts of acetylcholine. It also has other medical uses.

**Bacteria.** Single-celled organisms that multiply by cell division and that can cause disease in humans, plants, or animals.

**Battle Dress Overgarment (BDO).** A multi-piece suit used by the military for protection against chemical warfare agents.

**Biochemicals.** The chemicals that make up or are produced by living things.

**Biological Warfare.** The intentional use of biological agents as weapons to kill or injure
humans, animals, or plants or to damage equipment.

**Biological Warfare Agents.** Living organisms or the materials derived from them that cause disease in or harm humans, animals, or plants or cause deterioration of material. Biological agents may be used as liquid droplets, aerosols, or dry powders.

**Bioregulators.** Biochemicals that regulate bodily functions. Bioregulators that are produced by the body are termed "endogenous." Some of these same bioregulators can be chemically synthesized.

**Blister Agent.** A chemical warfare agent that produces local irritation and damage to the skin (vesicant) and mucous membranes, pain and injury to the eyes, reddening and blistering of the skin, and when inhaled, damage to the respiratory tract.

**Blood Agent.** A chemical warfare agent that is inhaled and absorbed into the blood. The blood (cyanogen) carries the agent to all body tissues where it interferes with the tissue oxygenation process.

**B-NICE.** Pertaining to biological, nuclear, incendiary, chemical, or explosives.

**Causative Agent.** The organism or toxin that is responsible for causing a specific disease or harmful effect.

**Ceiling Exposure Value.** The maximum airborne concentration of a biological or chemical agent to which a worker may be exposed at any time.

**Central Nervous System (CNS).**

**Chemical Abstract Service (CAS) Registry Number.** A number assigned to a material by the CAS to provide a single unique identifier.

**Chemical Agent.** A chemical substance that is intended for use in military operations to kill, seriously injure, or incapacitate people through its physiological effects. Excluded from consideration are riot control agents and smoke and flame materials. The agent may appear as a vapor, aerosol, or liquid; it can either be a casualty/toxic agent or an incapacitating agent.

**Chemical Agent Symbol.** A code, usually consisting of two letters, that is used as a designation to identify chemical agents (e.g., GB for the chemical agent sarin).

**Chemical Contamination.** The presence of a chemical agent on a person, object, or area.

**Choking Agents.** (1) Substances that cause physical injury to the lungs. Exposure is through inhalation. In extreme cases, membranes swell and lungs become filled with liquid. Death results
from lack of oxygen; hence the victim is "choked." (2) These agents exert their effects solely on the lungs and result in the irritation of the alveoli of the lungs. Agents cause the alveoli to constantly secrete watery fluid into the air sacs, which is called pulmonary edema. When a lethal amount of a choking agent is received, the air sacs become so flooded that the air cannot enter and the victim dies of anoxia (oxygen deficiency); also known as dry land drowning.

Classification of Chemical Agents. Chemical agents are classified according to their physical state, use, and physical action.

CNS Depressants. Compounds that have the predominant effect of depressing or blocking the activity of the CNS. The primary mental effects include the disruption of the ability to think, sedation, and lack of motivation.

CNS Stimulants. Compounds that have the predominant effect of flooding the brain with too much information. The primary mental effect is loss of concentration, causing indecisiveness and the lack of ability to act in a sustained, purposeful manner.

Concentration. The amount of a chemical agent present in a unit volume of air, usually expressed in milligrams per cubic meter (mg/m³).

Concentration Time. The amount of a chemical agent present in a unit volume of air multiplied by the time an individual is exposed to that concentration.

Conjunctivitis. Redness in the eye.

Consequence Management. Measures to alleviate the damage, loss, hardship, or suffering caused by emergencies. It includes measures to restore essential Government service, protect public health and safety, and provide emergency relief to affected governments, businesses, and individuals.

Contagious. Capable of being transmitted from one person to another.

Containment. The attempt to prevent the spreading of contamination by holding it in, enclosing, encapsulating, or controlling it.

Crisis Management. Measures to resolve the hostile situation, investigate, and prepare a criminal case for persecution under Federal law.

Cryogenics. Materials that exist at extremely low temperatures, such as nitrogen. Culture. A population of microorganisms grown in a medium.

Cumulative. Additional exposure rather than repeated exposure. For example, a 1-hour exposure of HO followed within a few hours by another exposure of 1 hour, had the same effect as a single
exposure lasting for 2 hours.

**Cutaneous.** Pertaining to the skin.

**Decontamination.** The process of making any person, object, or area safe by absorbing, destroying, neutralizing, making harmless, or removing the hazardous materials (HAZMAT).

**Desorption.** The reverse process of absorption. The agent will be "removed" from the surface (outgassing).

**Dilution Factor.** Dilution of contaminated air with uncontaminated air in a general area, room, or building for the purpose of health hazard or nuisance control, and/or for heating and cooling.

**Dosage.** The concentration of a chemical agent in the atmosphere (C) multiplied by the time (t) the concentration remains, expressed as mg-min/m. The dosage (Ct) received by a person depends upon how long he is exposed to the concentration. That is, the respiratory dosage in mg-min/m is equal to the time in minutes as the individual is unmasked in an agent cloud multiplied by the concentration of the cloud. The dosage is equal to the time of exposure in minutes of an individual's unprotected skin multiplied by the concentration of the agent cloud.

**Downwind Distance.** The distance a toxic agent vapor cloud will travel from its point of origin, with the wind.

**Evaporation Rate.** The rate at which a liquid changes to vapor at normal room temperature.

**Fungi.** Any group of plants mainly characterized by the absence of chlorophyll, the green colored compound found in other plants. Fungi range from microscopic single-celled plants (such as mold and mildew) to large plants (such as mushrooms).

**G-Series Nerve Agents.** Chemical agents moderate to high toxicity developed in the 1930s. Examples are tabun (GA), sarin (GB), and soman (GD).

**Host.** An animal or plant that harbors or nourishes another organism. Concentrations immediately dangerous to life and health (IDLH).

**Hydration.** The combining of a substance with water.

**Hydrolysis.** The reaction of any chemical substance with water by which decomposition of the substance occurs and one or more new substances are produced.

**IDLH.** Concentrations immediately dangerous to life and health. Incapacitating Agents. Produce temporary physiological and/or mental effects via action on the central nervous system. Effects may persist for hours or days, but victims usually do not require
medical treatment; however, such treatment speeds recovery.

**Industrial Agents.** 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 causalities or rendering equipment, facilities, or areas dangerous for use by man. Hydrogen cyanide, cyanogen chloride, phosgene, chloropicrin, and many herbicides and pesticides are industrial chemicals that can also be chemical agents.

**Infectious Agents.** Biological agents capable of reproducing in an infected host.

**Infectivity.** (1) The ability of an organism to spread. (2) The number of organisms required to cause an infection to secondary hosts. (3) The capability of an organism to spread out from the site of infection and cause disease in the host organism. Infectivity can also be viewed as the number of organisms required to cause an infection.

**Initial Downwind Vapor Hazard Area.** Areas initially established to evacuate all unprotected personnel and to prevent other unprotected personnel from entering and thus encountering agent vapors or any other type of contamination.

**Integrated Emergency Command Structure (IECS).** A system that allows for the integration of both career and volunteer fire/rescue personnel by equal rank for purposes of an on-scene incident command. (Montgomery County Fire Service definition.)

**Latent Period.** Specifically, in the case of mustard, the period between exposure and onset of signs and symptoms; otherwise, an incubation period.

**Lethal Chemical Agent.** An agent that may be used effectively in a field concentration to produce death.

**Level A Protection.** The level of protective equipment in situations where the material is considered acutely vapor toxic to the skin and hazards are unknown. Full encapsulation, air tight chemical suit with Self-Contained Breathing Apparatus (SCBA) or Supplied Air Breathing Apparatus (SABA).

**Level B Protection.** The level of protective equipment in situations where the environment is not considered acutely vapor toxic to skin but may cause respiratory effects. Chemical splash suit or full coverage non-air tight chemical suit with SCBA or SABA.

**Level C Protection.** The level of protective equipment required to prevent respiratory exposure but not to exclude possible skin contact. Chemical splash suit with cartridge respirator.

**Level D Protection.** The level of protective equipment required when the atmosphere contains no known hazard; when splashes, immersions, inhalation, or contact with hazardous levels of any
chemical is precluded. Work uniform such as coveralls, boots, leather gloves, and hard hat.

**Liquid Agent.** A chemical agent that appears to be an oily film or droplets. The color ranges from clear to brownish amber.

**MB Chemical Agent Detector Paper.** A paper used to detect and identify liquid V- and G-type nerve agents and H-type blister agents.

**M256 kit.** A kit that detects and identifies vapor concentrations of nerve, blister, and blood agents.

**Median Incapacitating Dosage (ICT\(_{50}\)).** The volume of a chemical agent vapor or aerosol inhaled that is sufficient to disable 50 percent of exposed, unprotected people (expressed as mg-min/m\(^3\)).

**Median Incapacitating Dosage (ID\(_{50}\)).** The volume of a liquid chemical agent expected to incapacitate 50 percent of a group of exposed, unprotected individuals.

** Median Lethal Dosage (LCT 50).** The amount of liquid chemical agent expected to kill 50 percent of a group of exposed, unprotected individuals.

**Methods of Dissemination.** The way a chemical agent or compound is finally released into the atmosphere.

**Microorganism.** Any organism such as bacteria, viruses, and some fungi, that can be seen only with a microscope.

**Miosis.** A condition where the pupil of the eye becomes contracted (pinpointed), which impairs night vision.


**Nerve Agents.** Substances that interfere with the central nervous system. Exposure is primarily through contact with the liquid (skin and eyes) and secondarily through inhalation of the vapor. Three distinct symptoms associated with nerve agents are pinpoint pupils, an extreme headache, and severe tightness in the chest.

**Nonresistant Agent.** An agent that, upon release, loses its ability to cause casualties after 10 to 15 minutes. It has a high evaporation rate and is lighter than air and will disperse rapidly. It is considered to be a short-term hazard; however, in small unventilated areas, the agent will be more persistent.

**NBC.** Nuclear, Biological, and Chemical.

**Organism.** Any individual living thing, whether animal or plant.
Organophosphate. A compound with a specific phosphate group that inhibits acetylcholinesterase. Used in chemical warfare and as an insecticide.

Organophosphorus Compound. A compound containing the elements phosphorus and carbon, whose physiological effects include inhabitation of acetylcholinesterase. Many pesticides (malathion and parathion), and virtually all nerve agents, are organophosphorus compounds.

Parasite. Any organism that lives in or on another organism without providing benefit in return.

Pathogen. Any organism (usually living) capable of producing serious disease or death, such as bacteria, fungi, and viruses.

Pathogenic Agent. Biological agents capable of causing serious diseases.

Percutaneous Agent. Able to be absorbed through the body.

Permeation. The process by which a chemical moves through a protective clothing.

Permeation Rate. The rate at which the challenge chemical permeates the fabric.

Permissible Exposure Limit (PEL). An occupational health term used to describe exposure limits for employees. Usually described in Time-Weighted Averages (TWAs) or Short-Term Exposure Limits (STELs).

Persistent Agent. An agent that remains in the target area for longer periods of time. Hazards from both vapor and liquid may exist for hours, days, or in exceptional cases, weeks or months after dissemination of the agent. As a general rule, persistent agent's duration will be greater than 12 hours.

Physiological Action. Most toxic chemical agents are used for their toxic effects, that is, to produce a harmful physiological reaction when applied to the human body externally, or when breathed or taken internally. This reaction of chemical agents, within the body or on the body, is the physiological action.

Precursor. A chemical substance required for the manufacture of chemical agent.

Rad. A measurement of the absorbed dose of radiation is known as rad.

Rate of Action. The rate at which the body reacts to or is affected by a chemical substance or material.

Rate of Detoxification. The rate at which the body can counteract the effects of a poisonous chemical substance.
Rate of Hydrolysis. The rate at which the various chemical agents or compounds are decomposed by water.

Reconnaissance (RECON). A primary survey to gather information.

Respiratory Dosage. This is equal to the time in minutes an individual is unmasked in an agent cloud multiplied by the concentration of the cloud.

Rhinorrhea. A runny nose.

Rickettsia. Any of a family (Rickettsiaceae) of pleomorphic rod-shaped nonfilterable microorganisms that cause various diseases (as typhus).

SCBA. Self-Contained Breathing Apparatus.

Sensitize. To become highly responsive or easily receptive to the effects of toxic chemical agents after the initial exposure.

Skin Dosage. This is equal to the time of exposure in minutes of an individual's unprotected skin multiplied by the concentration of the agent cloud.

Solubility. The ability of a material to dissolve in water or another liquid. Solvent. A material that is capable of dissolving another chemical.

Source Strength. The weight of a chemical agent that is at the chemical accident/incident site and may be released into the environment.

Specific Gravity. The weight of a liquid compared to the weight of an equal volume of water.

Spore. A reproductive form some microorganisms can take to become resistant to environmental conditions, such as extreme heat or cold, while in a "resting phase."

SABA. Supplied Air Breathing Apparatus.

Tear Agents. Produce irritating or disabling effects such as a large flow of tears and intense eye pain and irritation of the skin that rapidly disappear within minutes after exposure.

Terrorism. A violent act or an act dangerous to human life, in violation of the criminal laws of the United States or any segment to intimidate or coerce a government, the civilian population or any segment thereof, in furtherance of political or social objectives. (U.S. Department of Justice)
Time-Weighted Average (TW A). The average concentration for a normal 8-hour workday and a 40-hour workweek, to which nearly all workers may be repeatedly exposed without adverse effect.

Toxicity. (1) A measure of the harmful effect produced by a given amount of toxin on a living organism. The relative toxicity of an agent can be expressed in milligrams of toxin needed per kilogram of body weight to kill experimental animals. (2) The property a material possesses that enables it to injure the physiological mechanism of an organism by chemical means, with the maximum effect being incapacitation or death.

Triage. Sorting. A technique of establishing rescue, decontamination, treatment, and transportation priorities in any event where the number of casualties overwhelm the resources of the emergency response organizations.

Upwind. In or toward the direction from which the wind blows. To be upwind of an item, the wind would be blowing from your position to the item.

Urticant. A chemical agent that produces irritation at the point of contact, resembling a stinging sensation, such as a bee sting. For example, the initial physiological effects of phosgene oxime (CX) upon contact with a person's skin.

Urticaria. A skin condition characterized by intensely itching, red, raised patches.

Vaccine. A preparation of killed or weakened microorganism products used to artificially induce immunity against a disease.

Vapor Agent. A gaseous form of a chemical agent. If heavier than air, the cloud will be close to the ground; if lighter than air, the cloud will rise and disperse more quickly.

Vapor Density. A comparison of any gas or vapor to the weight of an equal amount of air.

Vesicant Agent. An agent that acts on the eyes and lungs and blisters the skin. Vesicles. Blisters on the skin.

Virus. An infectious microorganism that exists as a particle rather than as a complete cell. Particle sizes range from 200 to 400 manometers (one-billionth of a meter). Viruses are not capable of reproducing outside of a host cell.

Viscosity. The degree to which a fluid resists flow.

Volatile. (1) A measure of how readily a substance will vaporize. (2) With chemical agent, it refers to their ability to change from a liquid state into a gaseous state. (The ability of a material to evaporate.)
**Vomiting Agents.** Produce nausea and vomiting affects; can also cause coughing, sneezing, pain in the nose and throat, nasal discharge, and tears.

**V-Series Nerve Agents.** Chemical agents of the moderate to high toxicity developed in the 1950s. They are generally persistent.

**Wheal.** An acute swelling of the skin. This condition is common to a bee sting.

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