
ADMINISTRATIVE DIRECTIVE – 114.004
PERSONAL PROTECTIVE EQUIPMENT

EFFECTIVE DATE: January 18, 2007

REVISION DATE: April 20, 2007

REVIEW DATE:

AFFECTS: Sworn Personnel

I. PURPOSE

The purpose of this order is to establish procedures for the use of departmental Personal Protective Equipment (PPE).

II. POLICY

Given the nature of a terrorist act or the accidental release of dangerous chemicals, knowing in advance where an incident may occur is practically impossible. The type of chemical, biological, or radiological agent used during an attack or accident may not be known until confirmed by a technical team. This directive introduces the techniques, procedures, and different types of PPE /clothing used at an incident site.

III. DEFINITIONS

A. Hot Zone (Exclusion Zone)

The hot zone is the area where the actual incident occurred and contamination exists. All individuals entering the hot zone must wear the prescribed levels of PPE and be decontaminated before leaving. Entry and exit check points will be established at the outer boundary of the hot zone to regulate the entry and exit of personnel and equipment.

B. Warm Zone (Contamination Reduction Zone)

The warm zone is the transitional area between the hot zone and the cold zone. This zone generally contains the decontamination area and access control points through which personnel and equipment enter and exit. Since this zone is less hazardous, personnel can wear lower levels of PPE.

C. Cold Zone (Support Zone)

The cold zone is the outermost part of the site and is considered non-contaminated. This is where the command post is located, along with support equipment. Normal work clothes are acceptable in this area.

D. CBRNE – Chemical, Biological, Radiological, Nuclear or Explosive event.

E. PPE – Level A - PPE Level A is a vapor-tight and liquid-resistant PPE ensemble consisting of the following: Positive pressure, full-face piece Self-Contained Breathing Apparatus (SCBA), totally-encapsulating chemical-protective suit, chemical-resistant outer and inner gloves, and chemical-resistant, steel-toe and shank boots.

F. PPE Level B – PPE Level B consists of: Positive pressure, full-face piece self-contained breathing apparatus (SCBA), hooded chemical-resistant clothing (overalls and long-sleeved jacket; coveralls; one or two-piece chemical-splash suit; disposable chemical-resistant overalls), chemical-resistant inner and outer gloves, and chemical-resistant steel-toe and shank boots.

G. PPE Level C – Like PPE Level B, the PPE Level C ensemble can be worn during operations in the warm zone. Unless the suit's material is splash-resistant, it is not recommended to engage in decontamination operations. The components of Level C PPE are as follows: Full-face or half-mask, air-purifying respirators (gas mask), hooded chemical-resistant clothing (overalls; two-piece chemical splash suit; disposable chemical-resistant overalls), chemical-resistant inner and outer gloves, and chemical-resistant boots (steel-toe and shank, optional).

H. PPE Level D – PPE level D consists of your duty uniform.

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- I. Decontamination – The removal of surface contaminants from clothing and/or skin. Four types:
 1. *Mass Decontamination* is the physical process of reducing or removing surface contaminants from large numbers of victims in potentially life-threatening situations in the fastest time possible.
 2. *Emergency Decontamination* is the physical process of immediately reducing contamination of individuals in potentially life-threatening situations with or without the formal establishment of a decontamination corridor.
 3. *Technical Decontamination* is the planned and systematic process of reducing contamination to a level that is as low as reasonably achievable.
 4. *Secondary Decontamination* is performed following mass decontamination, and after a victim has been removed from the hot zone. It is performed on an as-needed basis.

IV. PROCEDURES

With the exception of a few academics and the military, there is a limited understanding of chemical, biological, and radiological weapons and their effects. Few civilian law enforcement agencies understand, are prepared for, or have experienced the devastating effects of a terrorist-initiated WMD incident. The Department understands both the physical and psychological impact this type of incident may have on the public. Although the mechanisms of a WMD or chemical or industrial accident may vary, the result—mass destruction of life and/or property—remains a distinct and probable outcome. The Plano Police Department recognizes the need to respond to such incidents in a professional manner so as to maximize to the extent possible the well-being of all involved persons.

A. Initial Assessment

The first protective measure a law enforcement responder brings to a terrorist-initiated incident or chemical or industrial accident is his/her ability to assess or size-up the possible consequences of the incident. The law enforcement responder should be looking for a WMD indicator or perhaps multiple indicators to positively identify this incident as a true terrorist WMD event.

Regardless if the event is WMD related or a chemical/industrial accident, the initial assessment will incorporate the effect of physical factors—such as weather, wind, temperature, buildings and infrastructure, and method of dissemination—upon the lethality of the WMD agent or chemical involved. Additionally, the initial assessment will answer questions such as:

1. What is the nature of the incident?
2. What hazards are present?
3. How large is the area affected and can the area be isolated?
4. What location will make a good staging area(s)?
5. What entrance, exit, and safe routes would be good for equipment and personnel flow?

The decision to deploy PPE will fall to the Incident Commander (IC) as soon as possible after the initial assessment is completed. The IC will use all available information at his/her disposal, which may include consultation with fire personnel or other emergency management/services responders. The IC is responsible for establishing Hot, Warm, and Cold zones, as well as establishing restricted access points.

B. Harmful Characteristics

The realistic threat of a terrorist-initiated WMD incident or chemical/industrial accident places the

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safety of the public as well as the emergency response community at risk. Therefore, protection considerations for law enforcement responders during such events will focus on self-protection and public safety. Defensive protective measures are taken to mitigate exposure to the following characteristic of a WMD incident or chemical or industrial accident: These *harms* can be remembered with the acronym TRACEM.

1. *Thermal*—Thermal harm is the result of exposure to the extremes of heat and cold.
2. *Radiation*—Radiation harm refers to the three types of nuclear radiation: alpha, beta, and gamma (not radiation as a type of heat transfer).
3. *Asphyxiation*—Asphyxiation harm refers to the interference with oxygen flow during normal breathing. There are two types of asphyxiates: simple and chemical.
4. *Chemical*—Chemical harm refers to the effects from two broad types of chemical agents: toxic and corrosive materials.
5. *Etiological*—Etiological harm involves exposure to a living microorganism or its toxins, which causes, or may cause, human disease. Biological agents are the most obvious examples of etiological agents.
6. *Mechanical*—Mechanical harm causes trauma from contact with mechanical or physical hazards. One form of mechanical injury can result from an explosive device. Other types include routine slip, trip, and fall hazards.

C. Reducing Exposure

Police and emergency responders must isolate and secure the scene after evacuating people from the area. Having the ability to quickly locate and isolate the site of release will limit additional exposure and aid in the investigation process. The three primary means of eliminating or reducing exposures involve the considerations of time, distance, and shielding. These factors are embodied in the tactical and procedural measures employed by law enforcement responders.

1. *Time*—*Minimize the time spent in the affected area.* Since the amount of exposure occurs as a function of duration of exposure, less time means less exposure. This may be achieved by conducting “dry runs” (practicing the procedures to be performed, with all of the steps and manipulations performed without the hazardous materials). Conduct the work quickly and efficiently, but do not rush.
2. *Distance*—*Maximize the distance from the contaminated materials.* Exposure is inversely proportional to distance; therefore, greater distance means less exposure. Do not increase the distance to the point where tasks are jeopardized.
3. *Shielding*—*Use shielding wherever it is necessary to reduce or eliminate exposure.* By placing an appropriate shield between the contaminant source and the responder, some contamination is attenuated and exposure may be completely eliminated or reduced to an acceptable level. The type and amount of shielding needed to achieve a safe working level varies with the type and quantity of agent or material used.

D. Purpose of Decontamination

Removal of an agent from a victim's skin and clothing is critical. The amount of exposure time, as well as the dose of the agent the victim received, will determine the exposure and contamination level of the victim. This situation further reinforces the necessity to remove or reduce, as rapidly as possible, any agent that has been in contact with the victim. Equally important is ensuring that the

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proper PPE is worn during this process to limit the chance for cross-contamination or exposure of the responder.

The warm zone contains the decontamination area and access-control points, through which personnel and equipment enter and exit. Since this zone is less hazardous than the hot zone, but is still contaminated, personnel may wear PPE Levels B or C. It is critical to establish access control points for the warm zone and the decontamination corridor. To control the spread of contaminants, personnel and equipment should only move through these access control points.

The size and parameters of the warm zone from the hot and cold zones and the command post are based on conditions specific to each incident, the material involved, and the discretion of the Incident Commander (IC).

The Plano Fire Department is generally responsible for all decontamination operations.

E. Factors for Consideration in Personal Protective Equipment (PPE) Use

Responding to a chemical, biological, or radiological agent requires using appropriate PPE. Before entering a potential WMD environment or chemical/industrial accident scene, three variables must be known: the *oxygen content* of the mission area, the *type of agent* present in the area, and the *concentration* of that agent. Some chemicals that may be used as a WMD agent will deplete oxygen from the air. Level C provides protection from nuclear/radiological material and biological agents with High Efficiency Particulate Air (HEPA) filters. Keep in mind, however, that high concentrations of agents and operations in restricted environments can affect the afforded protection.

F. Respiratory Protection

1. Air-Purifying Respirators (APR)

There are several different types of Air-Purifying Respirator (APR), also known as gas masks, including half-face or full-face APR designs. The normal APR used for Level C emergency operations includes full-face pieces or tight-fitting coverings, and filtering systems that make up the APR. Each APR must use the filter specifically for that particular manufacturer's mask. An APR is issued to each patrol officer as part of his/her PPE equipment.

2. Powered Air-Purifying Respirators (PAPR)

The Powered Air-Purifying Respirator (PAPR) provides positive-pressure airflow to the responder using the PAPR unit and battery, airflow hose, and protective mask. Appropriate filters/cartridges/canisters are attached to the PAPR unit, which is affixed to a belt worn around the waist of the responder. As with an APR, it is imperative that the appropriate filters/cartridges/canisters are utilized on the PAPR unit to ensure the safety of the responder.

The PAPR is designed to draw air into the filters through the use of a pump powered by an attached battery, either rechargeable or non-rechargeable. Filtered air then travels through the unit, the air hose, and into the protective mask.

It is important that the PAPR unit, battery, air hose, and mask assembly be inspected for flaws each time prior to use. Verify that the air hose is connected to the PAPR unit, and that air is flowing, before donning the protective mask. The Plano PD Bomb and Tactical units are currently the only units issued PAPRs.

3. Self Contained Breathing Apparatus

The most critical component of either Level A or Level B is the equipment used to provide necessary respiratory protection. For either suit configuration, a Self-Contained Breathing

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Apparatus (SCBA) is used. SCBA have several characteristics that should be mentioned.

- a. SCBA can be used in Immediately Dangerous to Life and Health (IDLH) atmospheres.
- b. SCBA equipment is heavy and increases fatigue.
- c. The time a responder can operate in the hazardous environment is restricted, depending on PPE rating.
- d. SCBA contains medical grade D or better compressed air.
- e. The compressed air pressure in the police department's SCBA tanks is 4500 psi with a 60 minute time limit. Actual time depends on the responder's air usage rate, donning and doffing time, and decontamination considerations.

The Bomb Unit is the only unit at the police department currently issued SCBA. They will deploy with SCBA when IDLH conditions exists and response of the bomb unit into such an atmosphere is necessary.

G. Level C

First responders must always be aware of heat stress and the various physiological and psychological factors involved in working in Level C. Knowing your expected work rate, the ambient temperature, your physical and mental condition, and other environmental factors will help to alleviate many problems.

A number of environmental factors such as humidity, wind, sun, and shade contribute to heat stress, and the length of time that an individual can safely work. It is important, as a responder, to protect yourself and not become a casualty. Because communication ability is limited, response teams employ the two-man rule. Essentially, this rule says that all operations must employ at least two people (buddy system) working together—each checking the safety and status of the other.

Level C requires an Air-Purifying Respirator. Each APR must have filters designed for that particular mask. Filters are identified by their use and are marked with numbers and bands. Some of the more common filters and their uses are:

1. CS, CN, and oleo resin capicum spray—use a R95 or better filter
2. Organic Vapor is OV with a yellow or black band
3. Blood Borne Pathogens—HEPA Filter

Corrective lenses or contact lenses may be used with the APR if they do not interfere with the APR or protective clothing. Facial hair should be worn as to not interfere with the APR or protective clothing.

1. The Plano Police Department Level C PPE consists of:
 - a. Chemical-resistant clothing (Tychem CPF 3 Protective Coverall with Overhood, which includes chemical resistant gloves)
 - b. Millennium APR Respirator for CBRN applications
 - c. MSA ESP II voice Amplifier
 - d. Two CBRN canisters
 - e. Hazmat 16" steel toed boots with Sipe sole and steel mid-sole shank

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- f. Chemical-resistant tape (Chem-Tape). Chem-Tape has a permeability rating and has been tested for certain types of agents
 - g. Blackhawk Tactical Nythaneon carry bag.
- H. Donning of PPE Level C and APR

Each officer should obtain his/her Tychem suit, APR, boots, a roll of chemical-resistant tape, and a partner (buddy system) to assist.

 - 1. Sit on stool or chair and remove footgear.
 - 2. Put on Tychem suit and boots (suit goes inside boots).
 - 3. Put on APR and adjust the straps.
 - 4. Put on latex/vinyl gloves.
 - 5. Conduct an APR leak seal test:
 - a. Place hand over the opening on the voice-mitter of the facepiece.
 - b. Exhale strongly one time (air should escape from the contact area between the sides of the face, forehead, and the mask).
 - c. Place hands over the filter canister portal(s).
 - d. Inhale and hold for five seconds (mask should collapse on face, and remain collapsed for the duration of this step).
 - 6. Pull Tychem suit hood on.
 - 7. Partner assist: Tape/seal team member's suit.
 - a. Place chemical-resistant tape on both of partner's suit-boot junctions (center the tape at the junction).
 - b. Tear off several 3" to 4" pieces of tape. Place chemical tape on partner's suit-mask junctions (center the tape at the junction). Do not place tape directly under the chin.
 - c. Double one piece of tape (6" long) onto itself; using another piece of tape, secure the doubled piece under the chin.
 - 8. Put on and snap outer hood.
 - 9. Put on police traffic vest for identification purposes.
 - 10. Reverse roles and repeat the procedure.
- I. Doffing of PPE Level C and APR
 - 1. Remove police traffic vest.
 - 2. Remove all chemical-resistant tape from Tychem suit. This will require assistance from a partner (buddy system).
 - 3. Sit down on a stool or chair and remove boots.
 - 4. Unzip protective suit and remove hood from head.
 - 5. Peel protective suit down from head to toe and step out of the suit.

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6. Remove APR and latex/vinyl gloves.

The removal of PPE may occur as a part of a decontamination process. In such a case, Plano Fire Department personnel will assist in the removal of the PPE. In addition, medical screening may take place immediately following the doffing of PPE, especially if doffing occurred as part of decontamination. Medical personnel will direct and/or coordinate any such medical screening.

J. Storage and Distribution

Patrol officers are required to carry their individually issued APRs (gas mask) in their patrol vehicles while on duty. Officers have the option of carrying all of their PPE (stored in their Blackhawk tactical Nyltaneon carry bag) inside their patrol vehicles while on duty.

Storage of PPE bags not carried by individual patrol officers will be located in the caged area behind the mail room, located between the Quartermaster Unit and the Juvenile CID area. Bags will be stored on shelving units and divided by Watch and Sector. All sworn supervisors will be issued keys to the locked storage cage and have access to the PPE. In the event of a CBRNE incident, a Watch Commander or Administrative Sergeant will coordinate the dispersal of the PPE to the area of the city affected by the incident.