

State of Delaware
Department of Health and Social Services
Division of Public Health
Standard Operating Guideline

Personal Protective Equipment (PPE) and Respiratory Protection Program

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1.0 Purpose

- 1.1 The Division of Public Health (DPH) has developed this Personal Protective Equipment (PPE) and Respiratory Protection Program Standard Operating Guideline (SOG) to help protect Delaware's Emergency Response community from exposure to potentially hazardous agents, including Chemical, Biological and Radiological (CBR). This SOG includes protective clothing levels, respiratory protection needs and personal decontamination guidance for emergency responders.

Emergency response personnel should adhere to their respective agency's pre-existing, hazard specific PPE plans (i.e., Fire Services, Department of Natural Resources and Environmental Control (DNREC - HazMat). This SOG should only be used to supplement pre-existing plans and is not intended to replace existing guidance.

- 1.2 Guidance herein is to help protect emergency response personnel from the risk of injury by creating a barrier against exposure to CBR hazards during non-routine or emergency situations. Personal Protective Equipment (PPE) is not a substitute for good engineering or administrative controls or good work practices, but should be used in conjunction with these controls to ensure the safety and health of emergency response personnel.
- 1.3 This SOG is intended to be used as a *guide* and does not replace sound judgment nor anticipates all situations, hazards or contingencies. This guide should be used in conjunction with existing emergency response agency directives, Occupational Safety and Health Administration (OSHA) and National Institute for Occupational Safety and Health (NIOSH) standards for PPE and Respiratory Protection.

2.0 Planning Assumptions

- 2.1 For the purpose of the this SOG, the emergency response personnel are described as:
- Emergency Management Agencies (EMA),
 - Emergency Medical Services
 - Advance Life Support (ALS)
 - Basic Life Support (BLS)
 - Fire Services (FS),
 - Governmental Administrative (GA),
 - Health Care (HC),
 - HazMat (HZ),

- Law Enforcement (LE),
- Public Health (PH),
- Public Safety Communications (PSC),
- Public Works (PW)

- 2.2 A natural or technological CBR incident has occurred requiring emergency response personnel to use personnel protective equipment and or respiratory protection.
- 2.3 Vapors, gases, and particulates from hazardous substance response activities place response personnel at risk.
- 2.4 Emergency response personnel could assist or provide care to possibly contaminated victims.
- 2.5 Hospitals have activated internal disaster plans that include selection and wear of PPE, care of contaminated victims, decontamination procedures, and protective action zones.
- 2.6 Emergency response personnel have been medically screened and cleared, fully trained, and qualified in the wear of PPE to include Fit testing for respirator use if required.
- 2.7 PPE is provided and properly maintained (Refer to section 3.2 and 3.8) when it has been determined that its use is required and that such use reduces or eliminates the likelihood of injury and/or illness.
- 2.8 For any given situation, protective clothing and respiratory protection is selected to ensure an adequate level of protection (Refer to section 3.2). The use of PPE can itself create significant worker hazards, such as heat stress, physical and psychological stress, and impaired vision, mobility and communication. Over-protection, as well as under-protection, can be hazardous and should be avoided where possible.
- 2.9 Emergency response personnel are aware of the protective action zones determined for each incident (Refer to Protective Action Zones, section 3.9). The more that is known about the hazards at a release site, the easier it becomes to select personal protective equipment.
- 2.10 Biological weapons may expose emergency response personnel to bacteria, viruses, or toxins as fine airborne particles and are unlikely to be recognized.

- 2.10.1 Because biological weapons are particles, they will not penetrate the materials of properly assembled and fitted respirators or protective clothing.
- 2.10.2 Some devices used for intentional biological terrorism may have the capacity to disseminate large quantities of biological materials in aerosols.
- 2.10.3 Biological agents are infectious through one or more of the following mechanisms of exposure, depending upon the particular type of agent:
- inhalation, with infection through respiratory mucosa or lung tissues
 - ingestion
 - contact with the mucous membranes of the eyes, or nasal tissues
 - or penetration of the skin through open cuts

3.0 Concept of Operation

3.1 General

- 3.1.1 The first priority for emergency response personnel responding to or providing care to victims of a Chemical, Biological or Radiological (CBR) incident is to protect themselves by wearing adequate personal protective equipment (Refer to section 3.2).
- 3.1.2 Emergency response personnel select the level of equipment based on the known properties of the hazardous agent. **When the agent is “unknown” Level A PPE is worn unless otherwise determined by the Incident Commander (IC) based on the event.**
- 3.1.2.1 A breakdown of known biological, chemical and radiological agents and level of personnel protective equipment required are identified in Tabs E - F.
- 3.1.3 Emergency **first** responders, HazMat and Fire Services, typically use positive pressure Self-Contained Breathing Apparatus (SCBA), *National Institute for Occupational Safety and Health (NIOSH)*, approved respirators with a full face piece during emergency responses. This type of SCBA provides the highest level of protection against airborne hazards when properly used and fitted to the user’s face.

3.1.4 To reduce emergency response personnel exposure to CBR hazards, appropriate PPE is used in accordance with this guide. There are basically four levels of personal protective equipment.

3.2 Personal Protective Equipment Levels

This guide uses the levels of protection identified in *Title 29 of the Code of Federal Regulations (CFR) 1910.120, Hazardous Waste Operations and Emergency Response (HAZWOPER)*. The levels of PPE described in this guide are Levels A, B, C, and D, with Level A being the maximum protection level.

3.2.1 Level A

3.2.1.1 Level A protection is required when the greatest potential for exposure to hazards exists and when the greatest level of skin, respiratory and eye protection is required. **When the agent is “unknown”, Level A PPE is worn unless otherwise determined by the Incident Commander based on the event.**

3.2.1.2 Level A PPE provides the highest level of respiratory, eye, mucous membrane, and skin protections.

3.2.1.3 Level A protective equipment/clothing includes:

- Positive-pressure, full face piece self-contained breathing apparatus (SCBA) or positive pressure supplied air respirator with escape SCBA (*NIOSH Approved*).
- Totally encapsulated chemical and vapor-protective suit (impermeable material)
- Chemical resistant inner and outer gloves
- Disposable protective suit, gloves and boots (depending on suit construction, may be worn



over totally-encapsulating suit). A general rule of thumb for chemical protective boots is that they should be two sizes larger than normal footwear.

3.2.2 Level B

3.2.2.1 Level B PPE is required when the highest level of respiratory protection with a lower level of dermal (skin) protection is needed. (Level A provides the highest dermal protection)

3.2.2.2 Level B protective equipment/clothing includes:

- Positive-pressure, full face piece self-contained breathing apparatus (SCBA) or positive pressure supplied air respirator (SAR) with escape SCBA (*NIOSH Approved*).
- Under-clothing: Chemical resistant overalls and long-sleeved jacket or disposable chemical resistant coveralls
- Over-clothing: Hooded two-piece chemical splash suit or hooded chemical resistant clothing (coveralls) made of impermeable material
- Chemical resistant inner and outer gloves
- Face shield
- Outer chemical resistant boots. A general rule of thumb for chemical protective boots is that they should be two sizes larger than normal footwear.



3.2.3 Level C

3.2.3.1 Level C protection is required when the concentration and type of airborne substance is known and the criteria for using air purifying respirators are met. **Note: The difference between Level C and Level B protection is the type of equipment used to protect the respiratory system, assuming the same type of clothing is worn.**

3.2.3.2 Level C PPE is used when the type of airborne exposure is known to be guarded against adequately by an air purifying respirator.

3.2.3.3 Level C protective equipment/clothing includes:

- Full face or half mask air purifying respirator (APR) or Powered Air Purifying Respirator (PAPR) (*NIOSH Approved*) with appropriate cartridge.
- Chemical resistant clothing: (Such as one piece coverall, hooded two piece chemical splash suit, chemical resistant hood and apron or disposable chemical resistant coveralls)
- Inner and outer chemical resistant gloves
- Escape mask (optional)
- Chemical resistant boots (Disposable outer-boots may also be worn) A general rule of thumb for chemical protective boots is that they should be two sizes larger than normal footwear.



3.2.4 Level D

3.2.4.1 Level D protection is the minimum protection required. Level D protection may be sufficient when no contaminants are present, work operations preclude splashes, immersion, the potential for unexpected inhalation or contact with hazardous agents.

3.2.4.2 Level D PPE provides limited respiratory protection and only minimal skin protection.

3.2.4.3 Level D protective equipment/clothing includes:

- Standard work clothes (such as coveralls, long sleeve shirt, trousers)
- Shoes or boots (steel toed boots depending on site condition or task performed)



Based on hazard exposure, PPE precautions may include:

- Contact Precautions (CP): Gloves, gown
- Droplet Precautions (DP): Face shield or safety glasses, surgical mask, shoe covers, surgical cap, gloves, gown
- Airborne Precautions (AP): N95 mask

3.3 Types of Respirators

3.3.1 Air-Purifying Respirator

3.3.1.1 These respirators remove air contaminants by filtering, absorbing, adsorbing, or chemical reaction with the contaminants as they pass through the respirator filter, canister or cartridge (Refer to figure 1). This respirator is to be used only where adequate oxygen (19.5 to 23.5 percent by volume) is available. Air-purifying respirators can be classified as follows:

- Positive pressure facepiece device such as a Powered Air Purifying Respirator (PAPR) or a negative pressure facepiece device such as an Air Purifying Respirator (APR).
- Particulate removing respirators, which filter out certain airborne infectious particles, dusts, fibers, fumes and mists. These respirators may be single-use disposable respirators (i.e., N95) or respirators with replaceable filters.
- Gas- and vapor-removing respirators, which remove specific individual contaminants or a combination of contaminants by absorption, adsorption or by chemical reaction. Gas masks and chemical-cartridge respirators are examples of gas- and vapor-removing respirators.
- Combination particulate/gas- and vapor-removing respirators, which combine the respirator characteristics of both kinds of air-purifying respirators.

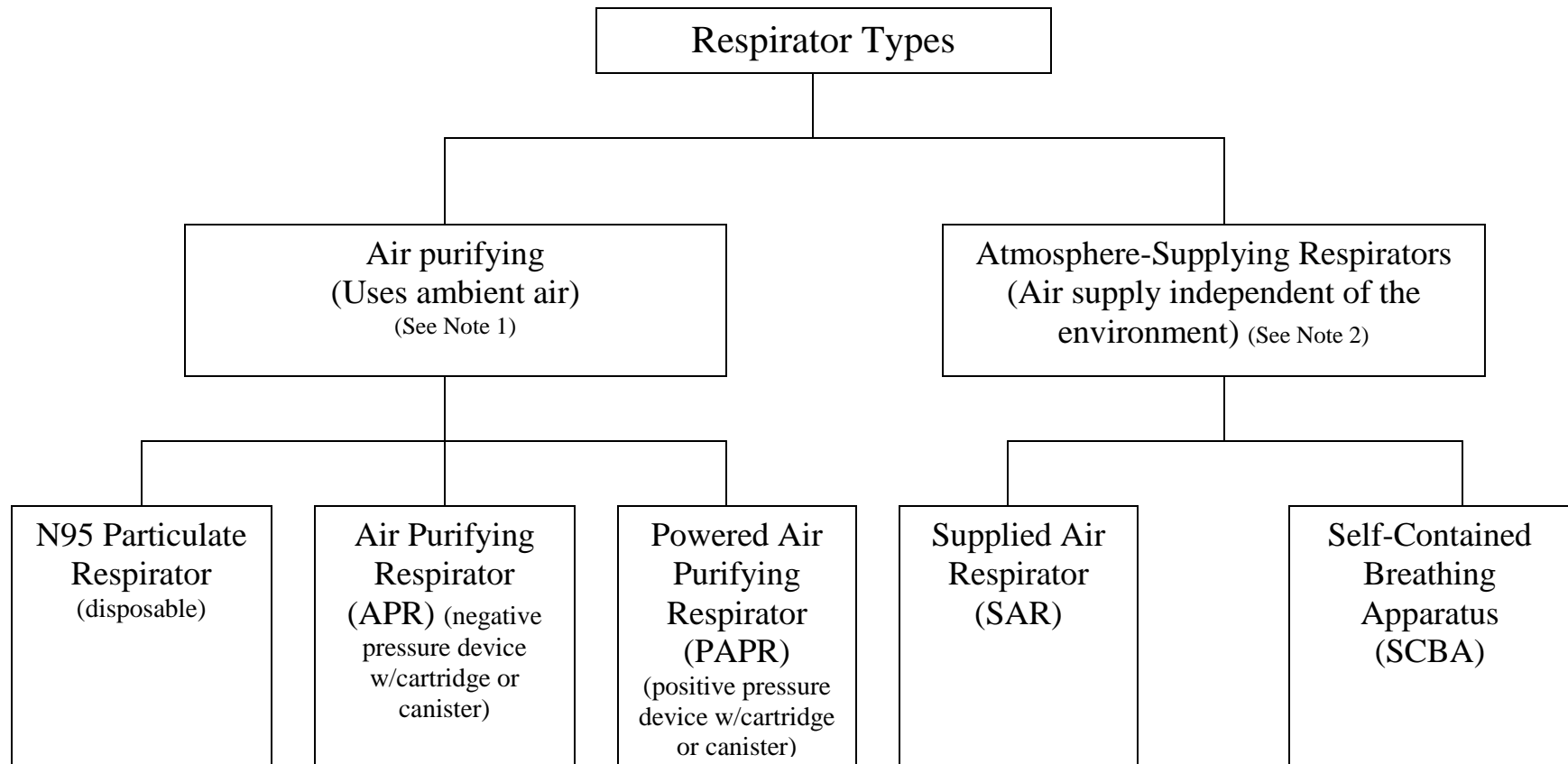
3.3.2 Atmosphere-Supplying Respirators

3.3.2.1 Atmosphere-supplying respirators provide or supply clean or dust free air directly to the inhaler from a source other than the air surrounding the atmosphere. Atmosphere-Supplying Respirators may be used to provide protection in an oxygen deficient atmosphere (<19.5 % oxygen) and in a highly toxic atmosphere. The user should be given specialized training before the use of these types of respirators. Atmosphere-Supplying Respirators include Supplied Air Respirators and Self-Contained Breathing Apparatus.

- **Supplied Air Respirators** - Supplied air respirators, pressure demand or continuous flow, provide clean and safe air to the inhaler with the help of a hose, which is connected to a stationary source of compressed breathing air. Based on the breathing requirement of the user, a sufficient volume of air is continuously or intermittently delivered to the wearer. Supplied Air Respirators are generally used when there are extended work periods needed in atmospheres that are not instantly harmful to life and health.

- **Self-Contained Breathing Apparatus** - This type of respirator allows the user complete independence from a fixed source of air and offers the greatest degree of protection but is also the most complex. Training and practice in its use and maintenance is essential. This type of device will be used in emergency situations only.

Figure 1 – Respirator Types



Notes:

1. Air Purifying Respirators (Positive and Negative Pressure) - Have filters, cartridges, or canisters that remove contaminants from the air by passing the ambient air through the air-purifying element before it reaches the user.
2. Atmosphere-Supplying Respirators - Supply clean air directly to the user from a source other than the air surrounding the user.

3.4 Identification of Respirator Cartridges and Gas-Mask Canisters

- 3.4.1** Respirator cartridges and canisters are designed to protect against individual or a combination of potentially hazardous atmospheric contaminants, and are specifically labeled and color coded to indicate the type and nature of protection they provide.
- 3.4.2** The NIOSH approval label on the respirator specifies the maximum concentration of contaminant(s) for which the cartridge or canister is approved. For example, a label may read:

"DO NOT WEAR IN ATMOSPHERES IMMEDIATELY DANGEROUS TO LIFE. MUST BE USED IN AREAS CONTAINING AT LEAST 20 PERCENT OXYGEN. DO NOT WEAR IN ATMOSPHERES CONTAINING MORE THAN ONE-TENTH PERCENT ORGANIC VAPORS BY VOLUME. REFER TO COMPLETE LABEL ON RESPIRATOR OR CARTRIDGE CONTAINER FOR ASSEMBLY, MAINTENANCE, AND USE."

3.5 Warning Signs of Respirator Failure

3.5.1 Particulate Air-Purifying

- 3.5.1.1** When breathing difficulty is encountered with a particulate removing respirator (due to partial clogging with increased resistance), the filter(s) must be replaced. Disposable, non-filter, respirators must be discarded.

3.5.2 Gas or Vapor Air-Purifying

- 3.5.2.1** If, when using a gas or vapor respirator (chemical cartridge or canister), any of the warning properties (e.g., odor, taste, eye irritation, or respiratory irritation) occur, promptly leave the area and check the following:
- Proper face seal.
 - Damaged or missing respirator parts.
 - Saturated or inappropriate cartridge or canister.
- 3.5.2.2** If no discrepancies are observed, replace the cartridge or canister. If any of the warning properties appear again, the concentration of the contaminants may have exceeded the cartridge or canister

design specification. When this occurs, an airline respirator or SCBA is required.

3.6 Service Life of Air-Purifying Respirator Canisters and Cartridges

- 3.6.1** The canisters or cartridges of air-purifying respirators are intended to be used until filter resistance precludes further use, or the chemical sorbent is expended as signified by a specific warning property, e.g., odor, taste, etc.
- 3.6.2** New canisters, cartridges or filters should always be provided when a respirator is reissued.
- 3.6.3** When in doubt about the previous use of the respirator, obtain a replacement canister or cartridge.

3.7 Use and Limitations

- 3.7.1** PPE is intended to shield or isolate individuals from health and safety hazards that may be encountered as a result of a CBR incident. PPE is limited in its capability to completely protect users. In addition, the use of PPE can in itself create several worker hazards, including the following:
- Impaired mobility.
 - Impaired vision.
 - Impaired communication.
 - Increased workload and exertion.
- 3.7.2** The use of PPE also has the following limitations during use:
- Permeation and degradation susceptibility.
 - Physical factors (limited durability, flexibility, or other factors).
 - Available sizes.
 - Stay Time – Stay times represent the duration that someone can remain in the exposure concentration before the PPE becomes ineffective and a PPE change is necessary.
- 3.7.3** A person's medical condition can also limit the use of PPE. Some potential limiting medical conditions include the following:
- Compromised pulmonary function.
 - Heart disease.
 - Physical handicaps.
 - Obesity.

- Physical condition and age.

3.7.4 Environmental conditions such as heat and cold can affect both the performance of the PPE and the user in his or her ability to tolerate PPE use.

3.8 Maintenance, Storage and Shelf Life

3.8.1 PPE maintenance needs vary with the amount of use and complexity of the equipment.

3.8.1.1 Under all circumstances, manufacturer's recommendations and replacement parts should be used.

3.8.1.2 Taping, stapling, gluing, or other temporary measures should not be used to repair PPE. **Only trained, qualified personnel or manufacturer should repair PPE.**

3.8.1.3 Any type of defect in any part of the PPE negates its use in an emergency.

3.8.2 PPE should be stored to prevent damage or malfunction from exposure to dust, moisture, sunlight, chemicals, impact, and extreme temperatures. General rules to follow for proper PPE storage are listed below.

3.8.2.1 **Used and potentially contaminated PPE should be stored in a well ventilated area separate from clean PPE and street clothing and be properly disposed of. Contaminated PPE, that cannot be decontaminated, will be treated as hazardous waste and will be disposed of in accordance with hazardous waste procedures e.g. collected in properly labeled plastic bags, sealed and placed in airtight containers. Disposal procedures will be coordinated through the incident commander.**

3.8.2.2 Uncontaminated PPE, when stored, should be folded, hung, or stacked to prevent distortion or damaging creases.

3.8.2.3 PPE of similar appearance but different functions should not be stored together. For example, black gloves made of different materials (such as nitrile, neoprene, or natural rubber) could be mistaken for each other.

3.8.2.4 In the field, PPE should be stored in a clean location such as a vehicle or office. PPE should not be stored at work sites or any location that may allow the PPE to be exposed to dust or chemicals.

3.8.2.5 The **shelf-life** of PPE as recommended by manufacturer information or other guidelines should be noted for all PPE, and the ‘expiration date’ of the PPE should be clearly marked while the PPE is in storage.

- Filters/canisters are a **shelf-life** and **useful life** item that should be periodically rotated. There are generally two shelf-life durations associated to a given filter/canister. The first applies to the filter/canister in its factory package (**Shelf-life**) and the second to the duration of its effectiveness once removed from the package (**Useful-Life**).
- It is imperative that emergency response disciplines using respirators with filters/canisters establish a program whereby they replace “expired shelf-life” PPE and to receive standard updates on the effectiveness of the filters maintained.

3.9 Protective Action Zones

The Protective Action Zones for the purpose of this guide are divided into two site control areas, **Incident Site** and **Hospital Site**. Each site control area is further divided into three (3) zones: Hot Zone (Red Zone), Warm Zone (Yellow Zone) and Cold Zone (Green Zone).

3.9.1 Site control is an important part of managing any emergency response operation with hot zone denoting a contaminated area where adverse effects might be seen, warm zone being an initially clean area for close support and decontamination, and cold zone representing an area with no potential exposure.

3.9.2 Required levels of PPE are determined not only by the hazardous make-up of an agent, but the proximity of which the emergency responder comes in contact with such agents or victims of such agents also known as the Protective Action Zone.

3.9.3 Incident Site:

3.9.3.1 Hot Zone or Red Zone - Areas where significant contamination with chemical, biological, or radiological (CBR) agents has been confirmed or is strongly suspected but the area has not been characterized. The area is presumed to be life threatening from both skin contact and inhalation. **The Hot Zone should only be entered by personnel in higher levels of protection (Level A/B/C), as determined by the IC based on the event, who are certified to operate in this level of equipment.**

- Level A protection is generally needed when the active release is still occurring, or the release has stopped but there is no information about the duration of the release or the airborne concentrations of CBR agents.
- Level A protection should meet the requirements of *NFPA 1994-2001*, has been tested by a third party such as the *U.S. Army and Soldier and Biological Chemical Command (SBCCOM)*, or has undergone other manufacturer testing. A *NIOSH approved* CBR SCBA respirator should be used, if available.
- Respirators chosen initially for responders going into a known release area where CBR are suspected should be a positive pressure self-contained breathing apparatus (SCBA) with a fully encapsulating protective suit until monitoring results allow for other decisions.
- **CAUTION:** Air-purifying respirators will not protect users against oxygen-deficient atmospheres (<19.5 % oxygen), and are used in Immediately Dangerous to Life or Health (IDLH) conditions. The only respirators recommended for fire fighting are self-contained breathing apparatuses that have full face pieces and are operated in a pressure-demand or other positive-pressure mode.
- Other prudent work practices should include minimizing exposure time to that essential for lifesaving or initial monitoring, avoiding any unnecessary contact with surfaces or potentially contaminated material, use of natural ventilation

flows to reduce exposure, mandatory decontamination and post exit evaluation for signs and symptoms of exposure.

3.9.3.2 Warm Zone or Yellow Zone - Areas where contamination with chemical, biological, or radiological (CBR) agents is possible but active release has ended and initial monitoring exists.

- Areas in close proximity to the release area or that are known to be contaminated and certain job activities on the periphery of the event area should be considered for this zone.
- Risk factors that should be considered include determining the relative risk for job activities from inhalation based on available air monitoring results, skin contact and absorption potential, proximity to the event, and wind directions.
- **Use the other prudent work practices listed above for red zone exposures.**

3.9.3.3 Cold Zone or Green Zone - Areas where contamination with chemical, biological, or radiological (CBR) agents is unlikely. This zone covers the area beyond the expected significant dispersal range of the initial event and secondary contamination range caused by traffic and emergency responders.

3.9.4 Even in areas which are not thought to pose a hazard, there may be a concern or potential for a minimal level of transient or unknown exposures in the aftermath of an event. The following suggestions for prudent work practices may reduce the amount of concern regarding this potential:

3.9.4.1 Inform people of location of event and control zones.

3.9.4.2 Provide information regarding signs and symptoms of exposure.

3.9.4.3 Suggest a means for reporting suspected exposures.

3.9.4.4 Suggest attention to general hygiene practices.

3.9.4.5 Provide information on voluntary use of personal protective equipment.

3.9.5 Hospital Site:

3.9.5.1 Reasonable efforts should be taken by the hospital staff to recognize and initiate protective actions to save the emergency department and hospital from contamination.

3.9.5.2 Hot Zone – Red Zone – Designated area where contaminated or potentially contaminated victims are sequestered upon presentation to the hospital.

3.9.5.3 Warm Zone – Yellow Zone (Hospital Decontamination Zone)

This zone includes any area where the type and quantity of hazardous substance is unknown and where contaminated victims, contaminated equipment, or contaminated waste may be present.

- It is reasonably anticipated that employees in this zone might have exposure to contaminated victims, their belongings, equipment, or waste.
- This zone includes, but is not limited to, places where initial triage and/or medical stabilization of possibly contaminated victims occur, pre-decontamination waiting (staging) areas for victims, the actual decontamination area, and the post-decontamination victim inspection area.
- This area usually ends at the emergency department door.

3.9.5.4 Cold Zone – Green Zone (Hospital Post-decontamination Zone (ED and rest of the hospital, if necessary)). This is an area that is considered uncontaminated.

- Equipment and personnel are not expected to become contaminated in this area.
- At a hospital receiving contaminated victims, the Hospital Post-decontamination Zone includes the ED (unless contaminated).

3.10 Hazardous Agent Patient Care

3.10.1 Emergency personnel responding to a natural or technological CBR incident may be required to assist or provide care to victims of such an incident.

3.10.1.1 Identification of hazardous agents and how to handle victims of these agents is of utmost importance.

3.10.1.2 Emergency response personnel should take precautions to avoid secondary contamination while assisting victims of a CBR incident.

3.10.1.3 The following procedures (sections 3.10.2 – 3.10.5.2) for personal protection during patient care are recommendations and are not all inclusive.

3.10.2 Chemical Agent Hazards:

3.10.2.1 Respiratory and skin protection is recommended for emergency response personnel handling victims contaminated with chemical agent hazard.

3.10.2.2 Level C PPE with a PAPR or APR and chemical cartridge, rated for known substance, is recommended when handling victims contaminated with a known chemical agent hazard or volatile liquid until decontamination is complete. In general, level C PPE is used when the inhalation risk is known to be below levels expected to harm personnel and when eye, mucous membrane, and skin exposures are unlikely.

3.10.2.3 Level D (Standard Universal Precaution) PPE is required when handling victims, post-decontamination, exposed to a known chemical agent hazard gas at standard temperature and pressure (such as chlorine, phosgene, oxides of nitrogen, cyanide), because victims cannot breathe out hazardous gas and harm others.

3.10.2.4 When victims are exposed to a known chemical agent hazard vapor from volatile liquid (such as a nerve agent or blistering vapor), PPE is recommended because emergency responders may be exposed to low level off-gassing from the victims.

3.10.3 Biological Agent Hazards

3.10.3.1 Respiratory protection is recommended for emergency response personnel handling victims contaminated with biological hazards. Skin protection is largely unnecessary, because biological agent hazards are not active through unbroken skin (with the single exception of the mycotoxins, a poisonous substance produced by a fungus, which requires skin protection be used).

3.10.3.2 Personnel handling victims, post-decontamination, who have been exposed to a known biological agent hazard aerosol, are not required to wear protective equipment because secondary aerosolization of residual agent from clothing, skin, or hair is insignificant.

3.10.3.3 When victims are contaminated with a known biological agent hazard liquid or powder, level C and PAPR with a High Efficiency Particulate Air (HEPA) filter are recommended until decontamination is complete.

3.10.4 Radiological Agent Hazards:

3.10.4.1 When victims are exposed to external radiation (radiation that is given off by a nuclear source outside the body), but not contaminated with a radiation-emitting source, no PPE is required. If any doubt exists whether victims or their clothing are contaminated, they should be surveyed with appropriate radiation detection equipment.

3.10.4.2 When victims are contaminated externally with radioactive material (on their skin, hair, wounds, clothes), level D PPE is recommended (for example, waterproof barrier materials, such as waterproof surgical gown, mask, gloves, leg, and/or shoe coverings; standard precautions) until decontamination is complete. Double layers of gloves and frequent changes of the outer layer help reduce the spread of radioactive material.

3.10.4.3 Handle radioactive materials with tongs whenever possible. Lead-lined aprons are cumbersome and do not provide complete protection against gamma or neutron radiation. For this reason, experts currently recommend against their use when caring for a

radiation-contaminated victim. Healthcare workers should also wear radiological dosimeters while working in a contaminated environment.

3.10.4.4 When victims are contaminated internally with radioactive material, Level D PPE is required when handling body fluids (urine, feces, wound drainage). The healthcare facility radiation safety officer or health physicist can determine when the amount of radioactivity in the victim's body secretions has fallen to a non-dangerous level.

3.10.5 Unknown hazards (biological, chemical or both):

3.10.5.1 According to current *US Government Occupational Safety and Health Administration (OSHA) regulations*, Level A PPE is required for personnel responding to an unknown hazard. **When the agent is "unknown" Level A PPE is worn unless otherwise determined by the Incident Commander (IC) based on the event.**

3.10.5.2 Recommendations for hospital personnel are not yet clearly defined. SCBA in the hospital setting is more cumbersome to use. Some experts maintain that level C PPE with PAPR (with organic vapor cartridge and HEPA filter) provides adequate protection until decontamination is complete.

3.11 Decontamination

3.11.1 Decontamination is the process by which particulate, vapor, and/or liquid materials are safely removed from an exposed victim without further contaminating the casualty, environment, or the emergency responder. **Emergency responders, that may provide patient care, should don the appropriate PPE prior to coming into contact with contaminated patients (Refer to section 3.2).** The goals of decontamination are to:

- Remove the contaminated clothing and agent from the victim's skin thereby reducing further possible agent exposure and further effects among victims.
- Protect emergency responders and medical personnel from secondary transfer exposures.

- Provide victims with psychological comfort at, or near the incident site, so as to prevent them from spreading contamination over greater areas.
- Facilitate treatment and triage of contaminated victims.

3.11.2 Decontamination of protective equipment and clothing is an important precaution to make sure that any particles that might have settled on the outside of protective equipment or clothing are removed.

3.11.3 Decontamination sequences currently used for hazardous material emergencies should be used as appropriate for the level of protection employed.

3.11.4 Basic decontamination procedures are generally the same no matter what the agent. Thorough scrubbing with large amounts of lukewarm soapy water (preferred method) or a mixture of 9 parts water to 1 part bleach (9:1) (Hypochlorite solution) will greatly reduce the possibility of absorbing an agent through the skin.

Caution – Bleach (hypochlorite) Solution Use:

- **Bleach (hypochlorite) solutions should be rinsed off skin within 10 minutes of application.**
- **Do not use bleach solution in penetrating abdominal wounds, in the eye, in open chest wounds, or in open brain or spinal cord injuries. Irrigate these areas with copious amounts of sterile saline solution.**
- **Do not apply straight, undiluted bleach to the skin.**

3.11.5 During a mass casualty event, gross decontamination may be necessary to provide initial decontamination to a large number of contaminated victims and is usually done at or near the scene by HazMat or Fire Services personnel.

4.0 Respiratory Protection Program (29 CFR 1910-134)

4.1 The Respiratory Protection Program is designed to comply with the requirements of the Federal Occupational Safety and Health Administration (OSHA) Respiratory Protection Standard, 29 CFR 1910-134 which requires that a written respiratory protection program be established by an employer. The purpose of the

respiratory protection program is to ensure that emergency response agency employees are protected from exposure to respiratory hazards when respirators are necessary to protect the health of the employee. This section addresses the components of a Respiratory Protection Program which include: Medical Evaluations, Fit Testing, User Seal Check Procedures, Issuance of Respirators, Respirator Care and Record Keeping.

4.2 Medical Evaluations (29 CFR 1910.134 App C (Mandatory))

4.2.1 A physician or other licensed healthcare professional (PLHCP), initially and periodically thereafter, will provide a medical screening using the Medical Evaluation Questionnaire (Tab G) to make a determination as to whether or not an employee can wear the required respirator without physical or psychological risk. Based on the overall health of the individual and special medical tests (pulmonary function studies, EKG, etc.) as appropriate, the examining physician determines whether or not the individual should be restricted from wearing respiratory protective equipment. If a medical restriction is applied, the employee, his/her supervisor, and their respective agency are formally notified of the restriction.

4.2.2 Specific medical tests and procedures should be determined by the examining physician and should be in accordance with OSHA medical surveillance requirements and/or NIOSH recommendations.

4.2.3 All examinations and questionnaires are to remain confidential between the employee and licensed healthcare professional.

4.3 Respirator FIT Testing (29 CFR 1910-134 (f) (Mandatory))

4.3.1 A fit test must be used to determine the ability of each individual respirator wearer to obtain a satisfactory fit with any negative or positive pressure tight-fitting face piece.

4.3.2 Quantitative or qualitative fit tests should be performed prior to issue of any respirator. Personnel must successfully pass the fit test before being issued any respirator.

4.3.3 Respirator fitting should be conducted initially upon assignment requiring use of a respirator. Refitting should be conducted annually thereafter upon successful completion of the respirator training.

- 4.3.4 Fit testing should be conducted by a trained and certified individual designated by the RPPA and the test results should be the determining factor in selecting the type, model, and size of negative-pressure respirator for use by each individual respirator wearer.
- 4.3.5 **Emergency Response Personnel should not be permitted to wear a negative-pressure respirator until they have demonstrated that an acceptable fit can be obtained.**

4.4 Qualitative Fit Testing

- 4.4.1 Federal regulation 29 CFR 1910.134 App A requires qualitative fit tests of respirators and describes step-by-step procedures. RPPAs should ensure proper steps are followed and only trained and certified personnel conduct Fit Testing.
- 4.4.2 This test checks the subject's response to a chemical introduced outside the respirator face piece. This response is either voluntary or involuntary depending on the chemical used. Several methods may be used. The two most common are the irritant smoke test and the odorous vapor test.

4.4.2.1 Irritant Smoke

4.4.2.2 The irritant smoke test is an involuntary response test. Air purifying respirators must be equipped with a high efficiency particulate air (HEPA) filter for this test. An irritant smoke, usually either stannic chloride or titanium tetrachloride, is directed from a smoke tube toward the respirator. If the test subject does not respond to the irritant smoke, a satisfactory fit is assumed to be achieved. Any response to the smoke indicates an unsatisfactory fit.

4.4.2.3 The irritant smoke is an irritant to the eyes, skin, and mucous membranes. It should not be introduced directly onto the skin. **Caution: The test subject must keep his or her eyes closed during the testing if a full face piece mask is not used.**

4.4.2.4 Odorous Vapor

4.4.2.5 The odorous vapor test is a voluntary response test. It relies on the subject's ability to detect an odorous chemical while wearing the respirator. Air purifying respirators must be equipped with an

organic cartridge or canister for this test. Isoamyl acetate (banana oil) is the usual test.

4.4.2.6 If the subject cannot smell the chemical, the respirator will be momentarily pulled away from the subject's face. If the subject is then able to smell the chemical, a satisfactory fit is assumed. If the subject cannot smell the chemical with the respirator pulled away from the face, this test is inappropriate for this subject, and a different test will be used.

4.4.2.7 This test is limited by the wide variation of odor thresholds among individuals and the possibility of olfactory fatigue. Since it is a voluntary response test it depends upon an honest response.

4.5 Quantitative Fit Testing

Quantitative fit testing, using an approved fit test system, is generally performed on both full-face and half-face negative pressure respirators. Fit factors are determined by comparing the particle concentration outside the respirator with the concentration inside the respirator face piece. An acceptable fit is achieved when the respirator wearer successfully completes a series of six programmed exercises (normal breathing, deep breathing, moving head up and down, moving head side to side, reading, and normal breathing) with a fit factor of 100 or more.

4.6 Special Problems

4.6.1 Facial Hair

4.6.1.1 No attempt is made to fit test a respirator on an employee who has facial hair which comes between the sealing periphery of the face piece and the face, or if facial hair interferes with normal functioning of the exhalation valve of the respirator.

4.6.1.2 A powered air purifying respirator (PAPR) fitted with a hood requires no fit testing but must be leak tested and can be worn by employees with facial hair and eyeglasses.

4.6.2 Glasses and Eye/Face Protective Devices

4.6.2.1 Proper fitting of a respiratory protective device face piece for individuals wearing corrective eyeglasses or goggles, may not be

established if temple bars or straps extend through the sealing edge of the face piece.

4.6.2.2 If eyeglasses, goggles, face shield or hard hat (helmet) must be worn with a respirator, they must be worn so as not to adversely affect the seal of the face piece.

4.6.2.3 If a full face piece respirator is used, special prescription glasses inserts are available if needed.

4.7 User Seal Check Procedures (29 CFR 1910-134 App B-1 (Mandatory))

4.7.1 Individuals who use a tight-fitting respirator are to perform a user seal check to ensure that an adequate seal is achieved each time the respirator is put on. Either the positive and or negative pressure checks listed below should be used. These checks are not a substitute for qualitative or quantitative fit tests. Respirator users should be properly trained in the performance of these checks and understands their limitations.

4.7.2 Negative Pressure Check

4.7.2.1 Applicability/Limitations: This test cannot be carried out on all respirators; however, it can be used on face pieces of air purifying respirators equipped with tight-fitting respirator inlet covers and on atmosphere supplying respirators equipped with breathing tubes which can be squeezed or blocked at the inlet to prevent the passage of air.

4.7.2.2 Procedures:

- Close off the inlet opening of the respirator's canister(s), cartridge(s), or filter(s) with the palm of the hand, or squeeze the breathing air tube or block its inlet so that it will not allow the passage of air.
- Inhale gently and hold for at least 10 seconds. If the face piece collapses slightly and no inward leakage of air into the face piece is detected, it can be reasonably assumed that the respirator has been properly positioned and the exhalation valve and face piece are not leaking.

4.7.3 Positive Pressure Check

4.7.3.1 Applicability/Limitations: This test cannot be carried out on all respirators; however, respirators equipped with exhalation valves can be tested.

4.7.3.2 Procedures:

- Close off the exhalation valve or the breathing tube with the palm of the hand.
- Exhale gently. If the respirator has been properly positioned, a slight, positive pressure will build up inside the face piece without detection of any outward air leak between the sealing surface of the face piece and the face.

4.8 Issuance of Respirators

4.8.1 Respiratory protective equipment should not be ordered, purchased, or issued to personnel unless the respirator wearer has received respirator training and a fit test.

4.8.2 Emergency response personnel who require respiratory protective equipment or respond to an incident requiring the use of respiratory protective equipment should be placed into the Respiratory Protection Program within their respective agency before being issued equipment.

4.9 Respirator Care (29 CFR 1910-134 (h))

4.9.1 Cleaning

4.9.1.1 All respirators in routine use should be cleaned and sanitized on a periodic basis. Respirators used non-routinely should be cleaned and sanitized after each use and filters and cartridges replaced. Routinely used respirators should be maintained individually by the respirator wearer. Replacement cartridges and filters should be obtained when the current cartridge and filters are no longer serviceable.

4.9.1.2 Cleaning and disinfection of respirators should be done frequently to ensure that skin-penetrating and dermatitis-causing contaminants are removed from the respirator surface.

Respirators maintained for emergency use or those used by more than one person should be cleaned after each use by the user.

4.9.1.3 Step-by-step procedures for cleaning and disinfecting respirators are located in Tab J.

4.9.2 Storage

4.9.2.1 After inspection, cleaning, and any necessary minor repairs (repairs should not be made to the N-95 mask), store respirators to protect against sunlight, heat, extreme cold, excessive moisture, damaging chemicals or other contaminants.

4.9.2.2 Respirators placed at stations and work areas for emergency use should be stored in compartments built for that purpose, should be quickly accessible at all times and should be clearly marked.

4.9.2.3 Routinely used respirators, such as N-95, half-mask or full-face air-purifying respirators, should be placed in sealable plastic bags to protect the integrity of the respirator.

4.9.2.4 Respirators may be stored in such places as lockers only if they are first placed in carrying cases or cartons.

4.9.2.5 Respirators should be packed or stored so that the face piece and exhalation valves will rest in a normal position and not be crushed.

4.9.2.6 Emergency use respirators should be stored in a sturdy compartment that is quickly accessible and clearly marked.

4.10 Record Keeping

4.10.1 The RPPA for each response agency should document and maintain record of Personal Protective Equipment training to include type and level of PPE trained on, method of training, date and the name of the instructor. Records should be maintained by individual response agencies.

4.10.2 Respirator fit-testing and medical screening should be documented and include:

- Type of respirator

- Brand name
- Model
- Method of test
- Test results
- Test date
- Name of the instructor/tester.

5.0 PPE Training

- 5.1** The proper use of any type of PPE requires adequate training. The overall goals of PPE training are to protect the wearer from physical hazards (biological, chemical, radioactive) and to prevent injury from improper use or equipment malfunction.
- 5.2** Appropriate training topics include hazard identification, medical monitoring, environmental surveillance, and the selection, use, maintenance, and decontamination of PPE.
- 5.3** Initial and/or refresher training should be provided prior to any emergency responder being issued PPE.
- 5.4** Emergency responders to include healthcare personnel who will decontaminate victims should be trained to the *First Responder Operations Level* with emphasis on the use of PPE and decontamination procedures. (*Refer to 29 CFR 1910.120(q)(6)*). The employer must certify that personnel are trained to safely perform their job duties and responsibilities. This includes a minimum of eight (8) hours of training or demonstrated competencies and an annual refresher.
- 5.4.1** Hospitals may develop an in-house training course on decontamination and PPE use and measures to prevent the spread of contamination to other portions of the hospital, or provide additional training in decontamination and PPE use after sending personnel to a standard *First Responder Operations Level* course.
- 5.4.2** EMS and Law Enforcement personnel are often the first on the scene and should be given *First Responder Awareness Level* training as a minimum. There is no specific hourly minimum required but the training must be sufficient or the employees must have proven experience in specific competencies with an annual refresher.

5.4.2.1 EMS and Law Enforcement personnel who have received only *First Responder Awareness Level* training should not be involved in the transport or treatment of contaminated patients.

5.4.2.2 EMS and Law Enforcement personnel who might be exposed to hazardous substances because they are expected to transport or treat contaminated patients at the release area should be trained to the *First Responder Operations Level*.

6.0 Responsibilities

6.1 Emergency Response Agencies

6.1.1 Emergency response agencies are responsible for establishing and maintaining a respiratory protection program consistent with the goal of protecting emergency response personnel. Emergency response agencies should implement a RPP which is designed and organized to ensure respirators are properly selected, used, and maintained by emergency response personnel, and to meet federal regulatory *standards* (29 CFR 1910.134) and industry accepted standards (ANSI).

6.1.2 Emergency response agencies must appoint a suitably trained Respiratory Protection Program Administrator (RPPA) to administer the respiratory program. (29 CFR 1910-134(c))

6.1.3 Emergency response agencies are responsible for evaluating those tasks for which respiratory protection is thought to be necessary, determine the degree of hazard posed by the potential exposure, determine whether engineering or administrative controls are feasible, and should specify which respiratory protection device is to be used at each task.

6.1.4 Emergency response agencies are responsible for evaluating assigned personnel who could potentially be exposed to airborne respiratory illnesses during non-routine or emergency situations for which respiratory protection is thought to be necessary.

6.1.5 Emergency response agencies should train personnel in the selection and use of respiratory protective devices, conduct qualitative and quantitative fit testing as required, and issue necessary protective devices.

6.1.6 Emergency response agencies should conduct initial and periodic medical screening of assigned personnel. A Licensed Healthcare Professional

should determine individual medical clearance by a medical questionnaire and/or medical exam (Refer to section 4.2). Employees refusing a medical evaluation should not be allowed to work in conditions requiring respirator use.

6.1.7 Emergency Response Agencies will ensure all emergency responders required to wear Personal Protective Equipment (PPE) have received *First Responder Awareness Level training or an approved equivalent course* prior to being issued PPE or respiratory protection equipment.

6.1.8 Emergency Response agencies will ensure emergency responders, to include healthcare personnel, who will decontaminate victims are trained to the *First Responder Operations Level* with emphasis on the use of PPE and decontamination procedures. (Refer to 29 CFR 1910.120(q) (6)). Agencies must certify that personnel are trained to safely perform their job duties and responsibilities. This includes a minimum of eight (8) hours of training or demonstrated competencies and an annual refresher. A record of training should be maintained on each emergency responder.

6.2 Respirator Wearers

6.2.1 It is the responsibility of each respirator wearer to wear his/her respirator when and where required and in the manner in which they were trained.

6.2.2 Respirator wearers should report any malfunctions of the respirator to his/her supervisor and the RPPA immediately.

6.2.3 The respirator wearer should also guard against mechanical damage to the respirator, clean the respirator as instructed, and store the respirator in a clean, sanitary location.

7.0 Plan Development and Maintenance

7.1 DPH is responsible for the Personal Protection Equipment (PPE) and Respiratory Protection SOG development and maintenance.

7.2 The PPE and Respiratory Protection Program Planning Committee advises DPH in the development and maintenance of the SOG.

7.3 DPH attempts to secure funding for the PPE and Respiratory Protection Program continued operation.

7.4 All participants are to review the SOG annually and submit suggested changes to DPH.

8.0 Training and Exercise

8.1 Agencies utilizing the DPH's PPE and Respiratory Protection Program are responsible for providing education and training to employees.

8.2 Required training should be offered after the PPE and Respiratory Protection SOG has been revised.

8.3 The PPE and Respiratory Protection SOG should be exercised annually. This may be accomplished through a tabletop, functional or full-scale exercise.

8.4 Just-In-Time Training

8.4.1 Definition – Just-in-Time Training is a concise, specific training provided just prior to its usage.

8.4.2 Situation – JIT is most typically used to orient new staff to their role. Prolonged events, events that cause workforce shortages, changes in procedures, new staff, are some reasons why JIT may be needed.

8.4.3 Delivery - JIT will most likely be delivered on site by Supervisors who have received Train-the-Trainer classes. The SHOC Logistics may deploy the JIT Team to the site. JIT may also be available via videoconference, pre-deployed materials and distance learning (DeTRAIN).

8.4.4 Content – JIT Content for the PPE and Respiratory Protection SOG includes:

- The types of emergencies that may require the use of Personal Protective Equipment (PPE)
- Identify the various levels of PPE and types of respirators
- Identify key points of use and limitations of PPE and respirators
- Describe the Hazard Zones of Incident response and Hospital Decontamination

9.0 Evaluation and Quality Improvement

- 9.1** PHPS will require After Action Reports (AARs) for each exercise conducted.
- 9.2** PHPS will review AAR and consider recommendations for improvement and will follow HSEEP guidelines.
- 9.3** Quality assurance and improvement activities including reviews of policy, procedures, protocols and processes are incorporated as part of the annual SOG review.

Tab A - References

- 1.0 American National Standards Institute: American National Standard For Respiratory Protection - Respirator Use - Physical Qualifications for Personnel, ANSI Z88.6, New York, NY: American National Standards Institute, 1984
- 2.0 American National Standards Institute: American National Standard Practices for Respiratory Protection, ANSI Z88.2, New York, NY: American National Standards Institute, 1989
- 3.0 CBRNE - Personal Protective Equipment, June 28, 2004, www.emedicine.com/emerg/topic894.htm#section~levels_of_personal_protective_equipment accessed December 23, 2005
- 4.0 CDC Personal Protective Equipment Manual, no date, website: cdc.gov/od/ohs/manual/pprotect.htm, accessed December 23, 2005
- 5.0 Colton, Craig, et. al., Respiratory Protection: A Manual and Guideline, 2nd Ed., Akron, OH: American Industrial Hygiene Association, 1991
- 6.0 Compressed Gas Association: Commodity Specification for Air. (ANSI/CGA G-7.1), Arlington, VA: Compressed Gas Association, Inc., 1989
- 7.0 New England Journal of Medicine, Vol 347, No 11, September 12, 2002
- 8.0 OSHA/NIOSH Interim Guidance - April 1, 2005, Chemical - Biological - Radiological - Nuclear (CBRN) Personal Protective Equipment Selection Matrix for Emergency Responders
- 9.0 OSHA Standard, 29 CFR 1910.134, "Respiratory Protection"

Tab B - Glossary

A

AAR After Action Report - A report that identifies the strengths and weaknesses of response to an event or an exercise.

ALS Advance Life Support

ANSI American National Standards Institute

AP Airborne Precautions

APR Air-Purifying Respirator - A respirator with an air-purifying filter, cartridge, or canister that removes specific air contaminants by passing ambient air through the air-purifying element.

B

Biological Warfare Agents Biological weapons include any organism (such as bacteria, viruses, or fungi) or toxin found in nature that can be used to kill or injure people. (Toxins are poisonous compounds produced by organisms.)

BLS Basic Life Support

C

CBR Chemical, Biological, Radiological

CFR Code of Federal Regulations

Chemical Warfare Agents Chemical weapon agents, known as CWAs, may result from industrial accidents, military stockpiling, war, or a terrorist attack. Industrial accidents are a significant potential source of exposure to chemical agents. Chemicals such as phosgene, cyanide, anhydrous ammonia, and chlorine are used widely.

CP Contact Precautions

D

Disposable Respirators A respirator that is discarded after the end of its recommended period of use, after excessive resistance or physical damage, or when odor breakthrough or other warning indicators render the respirator unsuitable for further use.

DP Droplet Precautions

DPH Division of Public Health

DSP Delaware State Police

E

EMA Emergency Management Agency

EMS Emergency Medical Services within the Division of Public Health

F

Fit Test Means the use of a protocol to qualitatively or quantitatively evaluate the fit of a respirator on an individual. (See also Qualitative fit test QLFT and Quantitative fit test QNFT.)

FS Fire Services

G

GA Government Administrative

H

HAZWOPER Hazardous Waste Operations and Emergency Response

HC Health Care

High-Efficiency Particulate Air (HEPA) Filter: A filter that is at least 99.97% efficient in removing monodispersed particles of 0.3 micrometers in diameter. The equivalent NIOSH 42 CFR 84 particulate filters are the N100, R100, and P100 filters.

HZ Hazardous Materials

I

IC Incident Commander - The individual responsible for the management of all incident operations at the incident site.

IDHL Immediately Dangerous to Health or Life

J

JIT Just-in-Time Training - A concise, specific training provided just prior to its usage.

K

L

LE Law Enforcement

M

N

Negative Pressure Respirator A tight-fitting respirator in which the air pressure inside the facepiece is negative during inhalation with respect to the ambient air pressure outside the respirator.

NFPA National Fire Protection Association

NIOSH National Institute for Occupational Safety and Health

O

OSHA Occupational Safety and Health Administration

P

PAPR Powered Air Purifying Respirator - A device equipped with a facepiece, hood, or helmet, breathing tube, canister, cartridge, filter, canister with filter, or cartridge with filter, and a blower.

PLHCP Physician or Other Licensed Health Care Professional - An individual whose legally permitted scope of practice (i.e., license, registration, or certification) allows him or her to independently provide, or be delegated the responsibility to provide, some or all of the health care services required for medical evaluation to wear a respirator.

PPE Personal Protective Equipment - Refers to the respiratory equipment, garments, and barrier materials used to protect rescuers and medical personnel from exposure to biological, chemical, and radioactive hazards.

PSC Public Safety Communications

PW Public Works

Q

QLFT Qualitative Fit Test - A pass/fail fit test to assess the adequacy of respirator fit that relies on the individual's response to the test agent.

QNFT Quantitative Fit Test - Means an assessment of the adequacy of respirator fit by numerically measuring the amount of leakage into the respirator.

R

Respirator Program Administrator The person responsible for all aspects of the respirator program with full authority to make decisions to ensure its success. The administrator must have sufficient knowledge (obtained by training or experience) to develop and implement the program. Preferably, he/she should have a background in industrial hygiene, safety, health care or engineering.

S

SAR Supplied Air Respirator

SBCCOM U.S Army Soldier and Biological Chemical Command.

SCBA Self-Contained Breathing Apparatus - An atmosphere-supplying respirator for which the breathing air source is designed to be carried by the user.

SOG Standard Operating Guideline

T

U

V

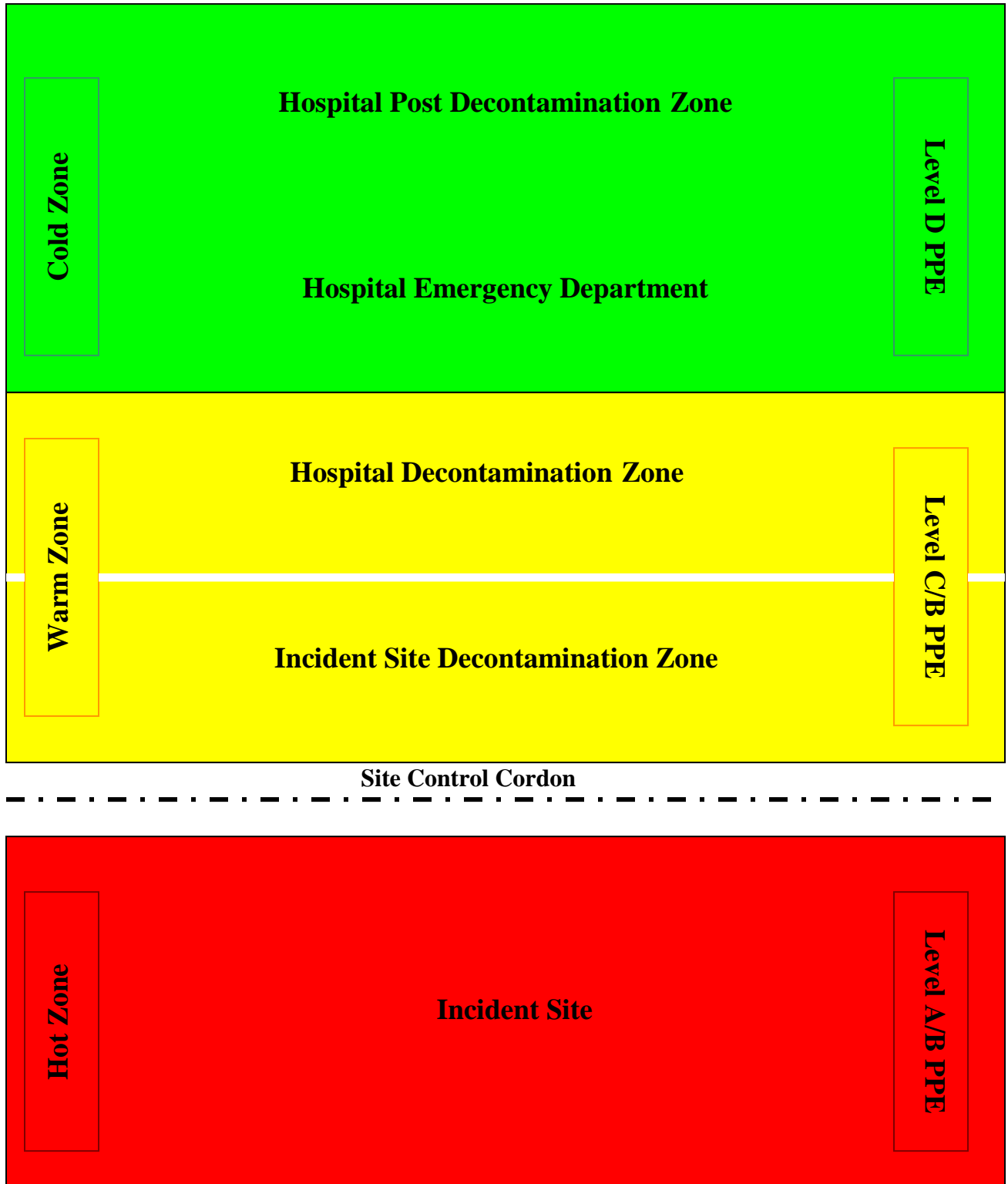
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Tab C - Protective Action Zones



Personal Protective Equipment (PPE) and Respiratory Protection Program Standard Operating Guideline

Final July 2008
Division of Public Health, State of Delaware

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Tab D - Biological Personal Protective Equipment Levels

Exposure	Transmission	Decontaminate Yes/No	Hot Zone	Warm Zone	Cold Zone	Comments
Biologicals	Unknown (See Comments)	Y	A	C	D/DP,AP	Level A if aerosolization is still occurring
Anthrax	Respiratory/Dermal/GI	Y	B	C	D	contact precautions for skin lesions
Botulism (toxin)	Respiratory/GI	Y	B	D/DP	D	
Brucellosis	Respiratory/Dermal/GI	Y	B	D/DP,AP	D	
Campylobacteriosis	GI	N	D	D	D	
Chagas Disease	Dermal/GI	N	D	D	D	transmission via infective triatome bug feces
Cholera	GI	N	D	D	D	
Cryptococcosis	Respiratory	N	D	D	D	mostly in immunocompromised population
Cryptosporidiosis	GI	N	D	D	D	
Cyclosporiasis	GI	N	D	D	D	
Cysticercosis	GI	N	D	D	D	
Dengue Fever	Dermal	N	D	D	D	transmission via Aedes mosquito
Diphtheria	Respiratory/Dermal	N	D	D	D	droplet precautions
Epsilon toxin	GI	N	D	D	D	
E. coli O157:H7	GI	N	D	D	D	
Glanders	Respiratory/Dermal	Y	B	C	D/DP,AP	
Hantavirus	Respiratory/Dermal	N	B	D/DP,AP	D/DP,AP	minimal P100 in warm zone
Hendra Virus	Respiratory/Dermal	N	B	D/DP,AP	D/DP,AP	
Hepatitis A	GI	N	D	D	D	

Exposure	Transmission	Decontaminate Yes/No	Hot Zone	Warm Zone	Cold Zone	Comments
Hepatitis B	Dermal	N	D	D	D	body fluids
Hepatitis C	Dermal	N	D	D	D	body fluids
Histoplasmosis	Respiratory	N	D	D	D	transmitted via spores
HIV/AIDS	Dermal	N	D	D	D	body fluids
Influenza	Respiratory	N	D	D	D	droplet precautions
Legionnaires' Disease	Respiratory	N	D/DP,AP	D	D	transmission via aerosolization
Leptospirosis	Dermal/GI	N	D	D	D	transmission via infective urine
Listeriosis	GI	N	D	D	D	
Lyme Disease	Dermal	N	D	D	D	transmission via ticks
Mad Cow Disease	GI	N	D	D	D	
Malaria	Dermal	N	D	D	D	transmission via Anopheles mosquito and blood contamination
Measles	Respiratory	N	D/DP,AP	D/DP,AP	D/DP,AP	standard precautions if immune
Meningitis	Respiratory	N	D	D	D	multiple types of meningitis
Melioidosis	Respiratory/Dermal/GI	Y	B	D/DP,AP	D	
Monkeypox	Respiratory/Dermal	N	B	D/DP,AP	D/DP,AP	
MRSA	Dermal	N	D	D	D	
Nipah Virus	Respiratory/Dermal	N	B	D/DP,AP	D/DP,AP	
Norovirus	GI	N	D	D	D	
Pertussis	Respiratory	N	D	D	D	
Plague	Respiratory/Dermal	Y	B	C	D/DP,AP	droplet precautions for pneumonic plague
Polio	GI	N	D	D	D	

Exposure	Transmission	Decontaminate Yes/No	Hot Zone	Warm Zone	Cold Zone	Comments
Psittacosis	Respiratory	Y	B	D/DP,AP	D	
Q Fever	Respiratory	Y	B	D/DP,AP	D	
Rabies	Dermal	N	D	D	D	
Ricin (toxin)	Respiratory/GI/Injection	Y	B	C	D	
Rift Valley Fever	Dermal	N	D	D	D	transmission via vectors or infective animal products; aerosol transmission in laboratory setting
Rotavirus	GI	N	D	D	D	
Salmonellosis	GI	N	D	D	D	
SARS	Respiratory	N	D/DP,AP	D/DP,AP	D/DP,AP	
Shigella	GI	N	D	D	D	
Sleeping Sickness	Dermal	N	D	D	D	transmission via tsetse fly
Small Pox	Respiratory/Dermal	N	B	D/DP,AP	D/DP,AP	isolation; airborne/contact precautions
Staphylococcal enterotoxin B	Respiratory/GI	Y	B	D/DP	D	
Tuberculosis	Respiratory/Dermal/GI	N	D/DP,AP	D/DP,AP	D/DP,AP	
Tularemia	Respiratory/Dermal/GI	Y	B	D/DP,AP	D	Level D/DP,AP,CP for lesions/pneumonia
Typhoid Fever	GI	N	D	D	D	
Typhus Fever	Respiratory/Dermal	Y	B	D/DP,AP	D	human-to-human transmission through vectors only
Valley Fever	Respiratory	N	D	D	D	airborne athroconidia
Variant Creutzfeldt-Jakob Disease	GI	N	D	D	D	
Varicella Zoster Virus	Respiratory/Dermal	N	B	D/DP,AP	D/DP,AP	
Viral Encephalitis	Respiratory/Dermal	N	B	D/DP,AP	D/DP,AP	

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Exposure	Transmission	Decontaminate Yes/No	Hot Zone	Warm Zone	Cold Zone	Comments
Viral Hemorrhagic	Respiratory	N	B	D/DP,AP	D/DP,AP	isolation; airborne/contact precautions
VISA/VRSA	Dermal	N	D	D	D	
West Nile Virus	Dermal	N	D	D	D	transmission via mosquito
Yellow Fever	Dermal	N	D	D	D	transmission via mosquito

• **CP** - Contact Precautions • **DP** - Droplet Precautions • **AP** - Airborne Precautions

Tab E - Chemical Personal Protective Equipment Levels

Exposure	Transmission	Decontaminate Yes/No	Hot Zone	Warm Zone	Cold Zone	Comments
Chemical	Unknown	Y (if liquid)	A	C	D	
Ammonia	Respiratory/Dermal	Y (if liquid)	A	C	D	
Arsine	Respiratory	N (gas)	B	D	D	
Benzene	Respiratory/Dermal	Y (if liquid)	A	C	D	
Chlorine	Respiratory/Dermal	Y (if liquid)	A	C	D	
Cyanide	Respiratory/Dermal	Y (if liquid)	A	C	D	
Hydrogen Fluoride	Respiratory/Dermal	Y (if liquid)	A	C	D	
Hydrogen Sulfide	Respiratory/Dermal	Y (if liquid)	A	C	D	
Mustard Gas	Respiratory/Dermal	Y (if liquid/vapor)	A	B	D	
Nerve Agents	Respiratory/Dermal	Y (if liquid/vapor)	A	B	D	
Phosgene	Respiratory/Dermal	Y (if liquid)	A	C	D	

• **CP** - Contact Precautions • **DP** - Droplet Precautions • **AP** - Airborne Precautions

Tab F - Radiological Personal Protective Equipment Levels

Exposure	Transmission	Decontaminate Yes/No	Hot Zone	Warm Zone	Cold Zone	Comments
Radiological	Unknown	Y	A	C	D	
Cobalt-60	Respiratory/Dermal/GI	Y	B	C	D	
Strontium-90	Respiratory/Dermal/GI	Y	B	C	D	
Iodine -125 or 131	Respiratory/Dermal/GI	Y	B	C	D	
Cesium 137	Respiratory/Dermal/GI	Y	B	C	D	
Iridium-192	Respiratory/Dermal/GI	Y	B	C	D	
Uranium-235 or 238	Respiratory/Dermal/GI	Y	B	C	D	
Plutonium-239	Respiratory/Dermal/GI	Y	B	C	D	
Americium-241	Respiratory/Dermal/GI	Y	B	C	D	

• **CP** - Contact Precautions • **DP** - Droplet Precautions • **AP** - Airborne Precautions

Tab G - Medical Evaluation Questionnaire Form

Emergency Response Agency Official Letterhead

Respirator Medical Evaluation Questionnaire

The following information must be provided by all emergency response personnel who may be required to wear respiratory protection in the performance of their duties. This form must be completed and reviewed by a Licensed Health Care Professional prior to being fit tested. A follow-up with you for further evaluation based on your responses to the questions in Part 2 of this form may be required.

Part 1.

Date: _____

Name: _____

Section/Branch: _____

Supervisor: _____

Age: _____

Sex (circle one): Male Female

Height: _____ ft. _____ in.

Weight: _____ lbs.

Job Title: _____

A phone number where you can be reached:

The best time to reach you at this number:

Have you ever worn a respirator in the past:

Yes___ No___

If yes, what type:

What type of respirator will you be using (please circle all that apply):

- a. N95
- b. ½ Face APR (Air Purifying Respirator)
- c. PAPR (Powered Air Purifying Respirator)
- d. SAR (Supplied Air Respirator)

Licensed Health Care Professional that reviews this questionnaire: _____

Part 2.

1. Do you **currently** smoke tobacco, or have you smoked tobacco in the last month: Yes No
2. Have you **ever had** any of the following conditions?
 - a. Seizures: Yes No
 - b. Diabetes (sugar disease): Yes No
 - c. Allergic reactions that interfere with your breathing: Yes No
 - d. Claustrophobia (fear of closed-in places): Yes No
 - e. Trouble smelling odors Yes No
3. Have you **ever had** any of the following pulmonary or lung problems?
 - a. Asbestosis: Yes No
 - b. Asthma: Yes No
 - c. Chronic Bronchitis: Yes No
 - d. Emphysema: Yes No
 - e. Pneumonia: Yes No
 - f. Tuberculosis: Yes No
 - g. Silicosis: Yes No
 - h. Pneumothorax: Yes No
 - i. Lung Cancer: Yes No
 - j. Broken Ribs: Yes No
 - k. Any chest injuries or surgeries: Yes No
 - l. Any other lung problem you have been told about: Yes No If yes, what?

4. Do you **currently** have any of the following symptoms of pulmonary lung illness?
 - a. Shortness of breath: Yes No
 - b. Shortness of breath when walking fast on level ground or walking up a slight hill or incline: Yes No
 - c. Shortness of breath when walking with other people at an ordinary pace on level ground: Yes No
 - d. Have to stop for breath when walking at your own pace on level ground: Yes No
 - e. Shortness of breath when washing or dressing yourself: Yes No
 - f. Shortness of breath that interferes with your job: Yes No
 - g. Coughing that produces phlegm: Yes No
 - h. Coughing that wakes you up early in the morning: Yes No
 - i. Coughing that occurs mostly when you are lying down: Yes No
 - j. Coughing up blood in the last month: Yes No
 - k. Wheezing: Yes No
 - l. Wheezing that interferes with your job: Yes No
 - m. Chest pain when you breathe deeply: Yes No
 - n. Any other symptoms that you think may be related to lung problems: Yes No If yes, what?

5. Have you **ever had** any of the following cardiovascular or heart problems?
- a. Heart Attack: Yes No
 - b. Stroke: Yes No
 - c. Angina: Yes No
 - d. Heart Failure: Yes No
 - e. Swelling in your legs or feet: Yes No
 - f. Heart arrhythmia: Yes No
 - g. High blood pressure: Yes No
 - h. Any other heart problem that you have been told about: Yes No
- If yes, what?
- _____
- _____
- _____

6. Have you **ever had** any of the following cardiovascular or heart symptoms:
- a. Frequent pain or tightness in your chest: Yes No
 - b. Pain or tightness in your chest during physical activity: Yes No
 - c. Pain or tightness in your chest that interferes with your job: Yes No
 - d. In the past two years, have you noticed your heart skipping or missing a beat: Yes No
 - e. Heartburn or indigestion that is not related to eating: Yes No
 - f. Any other symptoms that you think might be related to heart or circulation problems: Yes No
- If yes, what?
- _____
- _____
- _____

7. Do you **currently** take medication for any of the following problems?
- a. Breathing or lung problems: Yes No
 - b. Heart trouble: Yes No
 - c. Blood pressure: Yes No
 - d. Seizures: Yes No
8. If you've used a respirator, have you **ever had** any of the following problems?
- 8. Eye irritation: Yes No
 - 9. Skin allergies or rashes: Yes No
 - 10. Anxiety: Yes No
 - 11. General weakness or fatigue: Yes No
 - 12. Any other problem that interferes with your use of a respirator? Yes No
9. Would you like to talk to the Employee Health Professional who will review this questionnaire about your answers to the questionnaire? Yes No

For Licensed Health Care Professional Use Only

Employee Approved to Wear Respirator:

N-95 ½ Face APR PAPR SAR (circle all that apply)

Licensed Health Care Professional Signature:

Date: _____

Employee Signature:

Date: _____

**Personal Protective Equipment (PPE) and Respiratory Protection Program Standard
Operating Guideline**

Tab H - Fit Testing Forms

Quantitative Fit Test (QNFT) Form

Employee Name	Date of Birth (Year)	Height	Weight
Work Unit	Supervisor Name		

- A respirator fit test must be completed by an individual trained in respiratory fit testing procedures. **This fit test is required annually.**
- Does employee wear glasses? ___ Yes ___ No Does Employee have facial hair, dentures or other attributes that will prevent a positive face fit? ___ Yes ___ No

Respirator Type (Make Model and Certification Number)			
Testing media			
Compatible with eye glasses	___ Yes ___ No	___ Yes ___ No	___ Yes ___ No
Positive pressure fit check	___ Pass ___ Fail	___ Pass ___ Fail	___ Pass ___ Fail
Negative pressure fit check	___ Pass ___ Fail	___ Pass ___ Fail	___ Pass ___ Fail
Head Stationary Normal Breathing (60 seconds)	___ Pass ___ Fail	___ Pass ___ Fail	___ Pass ___ Fail
Head Stationary Deep Breathing (60 seconds)	___ Pass ___ Fail	___ Pass ___ Fail	___ Pass ___ Fail
Head Turning Side To Side (60 seconds)	___ Pass ___ Fail	___ Pass ___ Fail	___ Pass ___ Fail
Head Moving Up and Down (60 seconds)	___ Pass ___ Fail	___ Pass ___ Fail	___ Pass ___ Fail
Talking (recite Rainbow Passage or count backwards)	___ Pass ___ Fail	___ Pass ___ Fail	___ Pass ___ Fail
Grimace (15 sec)	___ Pass ___ Fail	___ Pass ___ Fail	___ Pass ___ Fail
Bending Over (60 seconds)	___ Pass ___ Fail	___ Pass ___ Fail	___ Pass ___ Fail
Head Stationary Normal Breathing (60 seconds)	___ Pass ___ Fail	___ Pass ___ Fail	___ Pass ___ Fail
Calculated Fit Factor			
Respirator fit test result (Half Mask >100 Fit Factor) (Full Face >1000 Fit Factor)	___ Pass ___ Fail	___ Pass ___ Fail	___ Pass ___ Fail

Based on information provided on this form, I certify that the employee named on this form can wear the respiratory protective equipment listed above

Signature of Person Administering Test _____ Date _____

Qualitative Fit Test (QLFT) Form

Employee Name	Date of Birth (Year)	Height	Weight
Work Unit	Supervisor Name		

A respirator fit test must be completed by an individual trained in respiratory fit testing procedures. **This fit test is required annually.**

Does employee wear glasses? ___ Yes ___ No Does Employee have facial hair, dentures or other attributes that will prevent a positive face fit? ___ Yes ___ No

Respirator Type (Make Model and Certification Number)			
Testing media			
Compatible with eye glasses	___ Yes ___ No	___ Yes ___ No	___ Yes ___ No
Positive pressure fit check	___ Pass ___ Fail	___ Pass ___ Fail	___ Pass ___ Fail
Negative pressure fit check	___ Pass ___ Fail	___ Pass ___ Fail	___ Pass ___ Fail
Head Stationary Normal Breathing (60 seconds)	___ Pass ___ Fail	___ Pass ___ Fail	___ Pass ___ Fail
Head Stationary Deep Breathing (60 seconds)	___ Pass ___ Fail	___ Pass ___ Fail	___ Pass ___ Fail
Head Turning Side To Side (60 seconds)	___ Pass ___ Fail	___ Pass ___ Fail	___ Pass ___ Fail
Head Moving Up and Down (60 seconds)	___ Pass ___ Fail	___ Pass ___ Fail	___ Pass ___ Fail
Talking (recite Rainbow Passage or count backwards)	___ Pass ___ Fail	___ Pass ___ Fail	___ Pass ___ Fail
Bending Over (60 seconds)	___ Pass ___ Fail	___ Pass ___ Fail	___ Pass ___ Fail
Head Stationary Normal Breathing (60 seconds)	___ Pass ___ Fail	___ Pass ___ Fail	___ Pass ___ Fail
Respirator fit test result	___ Pass ___ Fail	___ Pass ___ Fail	___ Pass ___ Fail

Based on information provided on this form, I certify that the employee named on this form can wear the respiratory protective equipment listed above.

Signature of Person Administering Test _____ Date _____

Tab I - Respirator Training Certification

RESPIRATOR TRAINING CERTIFICATION

I hereby certify that I have been trained in the proper use and limitations of the respirator issued to me. The training included the following:

1. Instruction on putting on, fitting, testing and wearing the respirator.
2. Instruction on inspection, cleaning, and maintaining the respirator.
3. Explanation of dangers related to misuse.
4. Instructions on emergency situations.

I further certify that I understand the use, care, and inspection of the respirator and have tested and worn the unit.

Date: _____

Signed: _____ SSN: _____

Respirator Type Issued: _____

Training Coordinator: _____

Tab J - Procedures for Cleaning Respirators

These procedures are not to be used for disposable N95 masks.

1. **Remove used filters, cartridges, or canisters and discard.** Disassemble face piece by removing speaking diaphragms, demand and pressure-demand valve assemblies, hoses, or any components recommended by the manufacturer. Discard or repair any defective parts.
2. Wash components in warm (43° C [110° F] maximum) water with a mild detergent or with a cleaner recommended by the manufacturer. A stiff bristle (not wire) brush may be used to facilitate the removal of dirt.
3. Rinse components thoroughly in clean, warm (43° C [110° F] maximum), preferably running water. Drain.
4. When the cleaner used does not contain a disinfecting agent, respirator components should be immersed for two minutes in one of the following:
 - Hypochlorite solution (50 ppm of chlorine) made by adding approximately one milliliter of laundry bleach to one liter of water at 43° C (110° F); or,
 - Aqueous solution of iodine (50 ppm iodine) made by adding approximately 0.8 milliliters of tincture of iodine (6-8 grams ammonium and/or potassium iodide/100 cc of 45% alcohol) to one liter of water at 43° C (110° F); or,
 - Other commercially available cleansers of equivalent disinfectant quality when used as directed, if their use is recommended or approved by the respirator manufacturer.
5. Rinse components thoroughly in clean, warm (43° C [110° F] maximum), preferably running water. Drain. The importance of thorough rinsing cannot be overemphasized. Detergents or disinfectants that dry on face pieces may result in dermatitis. In addition, some disinfectants may cause deterioration of rubber or corrosion of metal parts if not completely removed.
6. Components should be hand-dried with a clean lint-free cloth or air-dried.
7. Reassemble face piece, replacing filters, cartridges, and canisters where necessary.
8. Test the respirator to ensure that all components work properly.