U.S. Army Soldier and Biological Chemical Command

Homeland Defense Business Unit

Firefighters' Quick Reference Guide for Responding to Chemical and Biological Terrorist Incidents

Prepared by the U.S. Army Soldier and Biological Chemical Command Improved Response Program for the Department of Justice, Office of Justice Programs

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Section I – Introduction

Purpose: To provide firefighters a quick reference guide for the basics of identification of, and response to, an attack involving chemical and biological warfare agents. This guide is brief and general in nature. It supplements the U.S. Army Soldier and Biological Chemical Command (SBCCOM) Chemical Weapons Improved Response Program (CWIRP) and Biological Weapons Improved Response Program (BWIRP) reports that are referenced in this document. These reports should be read to obtain an indepth understanding of a fire-fighters' response to this type of incident.

Background: In 1997, under Public Law 104-201, the National Defense Authorization Act for Fiscal Year 1997, the Department of Defense (DoD) was tasked to assist Federal, State, and local officials in deterrence of, or response to, threats or acts of weapons of mass destruction (WMD) terrorism. Under the Nunn-Lugar-Domenici Domestic Preparedness Program (DPP), SBCCOM established the Improved Response Program (IRP) to identify systematic deficiencies in response capabilities of local communities. Within the IRP, SBCCOM established working groups, combining the scientific and engineering knowledge of the command with the functional expertise of the Federal, State, and local response community. The First Responder Group consisted of a wide variety of departments and disciplines that were Federal, State, and local representatives of first responder agencies. SBCCOM, working with these partners, developed the key response guidelines that are referenced throughout this guide and its supporting reference material.

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Chemical and Biological Agent Information

Chemical agents will show their symptomology in victims within 24 hours of being contaminated by an agent. Chemical agents are easier to manufacture and disseminate, and are much more stable than biological agents. Biological agents are different from chemical agents in that they do not affect the victim immediately. They need to incubate from days to weeks to infect the body systems.

The purpose of this section is to provide you a quick reference list of agents and what you need to know about them. Please refer to the following Biological and Chemical Agent Quick Reference Chart **(Figure 1).**

For more detailed information on chemical agents, please refer to:
http://www.sbccom.apgea.army.mil/RDA/msds/index.htm

http://ccc.apgea.army.mil/reference_materials/handbooks/RedHandbook/001TitlePage.htm

For more detailed information on biological agents, please refer to:
http://www.usamriid.army.mil/education/bluebook.html

Section III – Chemical and Biological Agent Information

Biological Agents				
AGENT	INCUBATION	LETHALITY	PERSISTENCE	DISSEMINATION
Bacteria				
Anthrax	1-4 days	3-5 days fatal	Very stable	Aerosol
Cholera	1.5-6 days	Low with treatment High without treatment	Unstable Stable in saltwater	Aerosol, sabotage of water
Plague	1-3 days	1-6 days fatal	Extremely stable	Aerosol
Tularemia	1-10 days	2 weeks moderate	Very stable	Aerosol
Q Fever	14-26 days	Weeks?	Stable	Aerosol, sabotage
Viruses				
Smallpox	7-17 days	High	Very stable	Aerosol
Venezuelan Equine Encephalitis	1-5 days	Low	Unstable	Aerosol, vectors
Ebola	4-21 days	7-16 days fatal	Unstable	Aerosol, direct contact
Biological Toxins				
Botulinum toxins	Hours to days	High without treatment	Stable	Aerosol, sabotage
Staphylococcal Enterotoxin B	1-6 days	Low	Stable	Aerosol, sabotage
Ricin	1-3 days	10-12 days fatal	Stable	Aerosol, sabotage
Tricothecene Mycotoxins (T2)	2-4 hours	Moderate	Extremely stable	Aerosol, sabotage

Chemical Agents				
AGENT	SIGNS AND SYMPTOMS	DECONTAMINATION	PERSISTENCE	PHYSICAL STATE
Nerve Agents				
Tabun GA	Salivation Lacrimation Urination Defecation Gastric disturbances Emesis	Remove contaminated clothing. Flush with soap and water solution for patients. Flush with large amounts of a 5% bleach and water solution for objects.	1-2 days if heavy concentration	Liquid
Sarin GB			1-2 days, will evaporate with water	Liquid
Soman GD			Moderate, 1-2 days	Liquid
V Agents VX			High, 1 week if heavy concentration. As volatile as motor oil.	Liquid
Vesicants (Blister Agents)				
Sulfur Mustard H	Acts first as a cell irritant, then as a cell poison. Conjunctivitis, reddened skin, blisters, nasal irritation, inflammation of throat and lungs.	Remove contaminated clothing. Flush with soap and water solution for patients. Flush with large amounts of a 5% bleach and water solution for objects.	Very high, days to weeks	Liquid
Distilled Mustard HD				
Nitrogen Mustard HN 1,3				
Mustargen HN2			Moderate	Liquid
Lewisite L	Immediate pain with blisters later.		Days, rapid hydrolysis with humidity	Liquid
Phosgene Oxime CX	Immediate pain with blisters later—necrosis equivalent to second and third degree burns.		Low, 2 hours in soil	Solid
Chemical Asphyxiants (Blood Agents)				
Hydrogen Cyanide AC	Cherry red skin or ~ 30% cyanosis. Patients may appear to be gasping for air. Seizures prior to death. Effect is similar to asphyxiation, but more sudden.	Remove contaminated clothing. Flush with soap and water solution for patients. Flush with large amounts of 5% bleach and water solution for objects.	Extremely volatile	Gas
Cyanogen Chloride CK			Rapidly evaporates and disperses	Gas

Figure 1. Biological and Chemical Agent Quick Reference Chart

9-1-1 Operators

The 9-1-1 Communications Center has the first opportunity to identify a potential chemical or biological incident. A terrorist attack will most likely yield an abundance of calls for assistance. Through close scrutiny of the information provided and rapid cross-checking of the numerous reports, a well-trained operator should be alerted to the possibility that the incident is not routine in nature. The key to saving lives of many victims and first responders on the scene is quickly identifying the incident and relaying this potential threat information and precautionary measures to **all** responding units.

- **Common Indicators of a Biological Weapons (BW) and/or Chemical Weapons (CW) Incident**

  - **Suspected Attack**

  After notification of the threat, a determination must be made regarding its validity. This decision is formulated through coordination with law enforcement. A threat assessment is the first step in identifying personal risk for those exposed as well as those responding.

  If the 9-1-1 operator receives a telephone threat, notations should be made of background noises (i.e., people talking, train whistles, or noises that will assist law enforcement in identifying where the call originated). If the caller is the person who received the threat, the operator must ask pertinent questions that will assist law enforcement officials in determining the validity of the reported attack or threat of an attack.

  If the caller witnessed the attack or is a victim of the attack, careful instructions to prevent panic until responding units arrive will be needed. Information-gathering questions must be asked of the caller to ascertain if there was an attack.

  Other indicators include the following:

  - Threat received via telephone, mail, e-mail, or delivered message.
  - Report of witnessing the attack.
  - Suspected or unknown substance found in the area.
  - Discovery of a dissemination device or other delivery mechanism.
  - Suspicious letter or package is involved.
  - Location of the suspected attack is a valid target.
  - Device described is technically logical and possible.
  - Agent is named.
  - Other reports of similar threats and/or activity with a developing pattern or possible connection between events.

Indicators of a BW Incident

- **Covert Attack**

Unfortunately, it is difficult to identify a covert BW attack. Symptoms of the infection may not appear for days to weeks after the exposure. Operators will begin to receive many calls for similar flu-like symptoms and respiratory complaints at an increasing rate as the incubation period increases.

Senior citizens, children, those who are immunosuppressed, and the human immuno-deficiency virus (HIV) population will begin to experience symptoms before others due to decreased immune defense systems. These people can cue health officials of a possible attack if early recognition of similar symptoms is reported. The occurrence and recognition of a very rare or out of place disease also may indicate a biological incident.

High Credible Indicators of a Possible BW Attack

- An open letter or package containing an unknown substance, which may include a message indicating a biological agent is involved.
- The substance is brown or sandy brown, indicative of anthrax, rather than stark white.

Less Credible Indicators that Represent a BW Attack

- The caller has not opened the envelope.
- An envelope that has been opened contains a white powder (may or may not be anthrax) but does not contain a note.
- A white powder comes in an envelope, which has been opened with expected mail, which is easy to trace to the sending source.

Indicators of a CW Incident

- Large volume of calls reporting sick or injured persons with no known reason.
- Numerous persons reporting similar illness signs and symptoms.
- Numerous calls from the same general geographic area or large gathering of people, such as a sporting event, reporting unusual illness.
- Symptoms indicative of chemical agent exposure include the following:
  - Drooling
  - Tearing
  - Shortness of breath
  - Difficulty breathing
  - Irritation of the eyes, nose, and throat
  - Skin redness or itching

- Report of an explosion with little or no structural damage.
- Reports of unexplained liquids (e.g., droplets, oily substances).
- Reports of unusual odors (e.g., mowed grass, garlic, bitter almonds).
- Reports of a release of a spray (e.g., hissing sounds, presence of a mist or vapor).
- Suspicious devices/packages (e.g., spray devices, damp/wet packages or bags, explosive device that causes little explosive damage).
- Unexplained dead wildlife/animals.
- Discarded personal protective equipment (PPE) such as masks, gloves, and gowns.

Questions for the Caller of a CW Incident

- Obtain the name, date of birth, address, and telephone number of victim.
- Was there a fire or explosion?
- Did you see the dispersal device(s)?
- If so, describe the device(s).
- Did you hear any hissing or spraying noises?
- Was there a mist or liquid dispersed?
  - Color of mist or liquid.
  - Odor? Describe type of odor.
- Is anyone injured or sick?
  - How many?
  - What are their symptoms and complaints?
- Is the incident inside or outside a building?
- What is the type of structure where the incident occurred?
- Did you see anyone or anything suspicious?
- Did you see anyone wearing protective clothing (e.g., mask, gloves, chemical suits)?
- Can you describe the perpetrator or a getaway vehicle?
- If you received the telephoned threat, can you describe any type of background noises that indicates the perpetrators' location?

Questions for the Caller of a BW Incident

- Obtain the name, date of birth, address, and telephone number of victim.
- Is there a suspect package or envelop?
- Is the suspect package at a residence or business? If it is a business, obtain the business name, address, and type of business.
- What is the occupation/employment of the victim? What are the victim's duties?
- Has the victim received threats by mail or telephone before? If yes, get details.

- Why does the victim think that he/she would be targeted?
- If there is an envelope or package:
  - Who or what is listed as the addressee on the envelope/package?
  - Who or what is listed as the return address on the envelope/package? Is the victim familiar with the sender?
  - Is the envelope/label typewritten or handwritten?
  - Does the envelope/package have a postmark? Where?
  - Does the envelope/package have a stamp? What kind of stamp? How many? Is there a meter strip?
  - What kind of envelope/package (business, personal, etc.)?
  - How was the envelope/package sealed (tape, adhesive, etc.)?
  - Are there any additional markings on the exterior of the envelope/package?
  - Are there any stains on the exterior of the envelope/package? Describe.
- If there is a note or letter:
  - Obtain summary of content of letter.
  - Is there an overt threat contained within the letter? Provide exact wording.
  - Are there any stains visible on the letter?
- Foreign Material Within the Envelope/Package:
  - Describe the material found within the envelope/package.
    - → Solid material:
      - ∗ What is the color of the material?
      - ∗ Describe granule size and shape (e.g. similar to sugar or powder).
      - ∗ Does the material have an obvious odor? Do not purposely inhale the product.
      - ∗ Did the material appear to become airborne upon opening?
    - → Liquid:
      - ∗ Describe the container size, type, and material (e.g. glass or plastic).
      - ∗ What is the color of the liquid?
      - ∗ Is the liquid transparent or opaque?
      - ∗ Is the liquid leaking from the container?
- Exposure:
  - When was the envelope/package received (date and time)?
  - What was the mode of delivery (USPS, FedEx, etc.)?
  - Where is the envelope/package or letter currently?
  - What areas of the body were exposed to the material?
  - Was there a spill? If so, how large?
  - How many others had contact with the envelope/package or product?
- Health:

- Is the victim experiencing any physical symptoms? What are the symptoms?
- How long after exposure did the symptoms occur?
- Has the victim already seen a doctor? If yes, obtain the name and contact information for doctor.

- Notifications
  - Has the victim notified the local police, fire department, hazardous material teams, or any other authority?

A sample 9-1-1 operators' checklist for identification of a chemical/biological incident is included at the end of this section (page 13). This checklist was developed as part of the Domestic Preparedness Program (DPP) Awareness Training.

- **Advice for a Caller Involved in a Liquid Hazard (Chemical Agent) Incident:**

  - If a suspected item or device is found, do not touch it or open it. Leave the item where it was found.
  - Do not use a 2-way radio within 300 feet of a suspected device.
  - Do not touch or handle any package that is leaking a liquid.
  - Take note of the color and consistency of the liquid.
  - Identify the location of the device, package, and any spilled or sprayed material.
  - Avoid all contact with any spilled liquid or liquid droplets.
  - If available, put an absorbent material on any spilled liquid. Examples include dirt, kitty litter, etc. but do not enter the area to do so.
  - Evacuate the immediate area closing doors and windows to the room where the device, package or release is.
  - In the case of a known release (spray, mist) avoid the use of elevators to evacuate the area. Elevators create a significant amount of air pull and can pull the agent into the elevator shaft.
  - Secure the immediate area to preclude others from entering until cleared by emergency responders.
  - Shut down air conditioning and heating systems to reduce the spread of vapors throughout other parts of the building.
  - Identify anyone who may have come in contact with the package, device, or liquid. Have them remove their outer clothing and place it in a plastic bag. Seal the bag using tape if necessary. Wash all exposed areas using soap and water.
  - Provide some form of modesty cover for those who disrobed. Use coats, tablecloths, or drapes etc. that were not in the area where the release or exposure occurred.
  - Keep potentially exposed people segregated from others to avoid any chance of cross-contamination.
  - Identify any potentially exposed persons who may have left the scene. Contact them and direct them to take precautions as listed above.
  - Keep all persons on the scene until the arrival of emergency responders.

- Direct people to stay away from structural doorways, exhaust vents, etc. where agent may be vented from an enclosed area.

- **Advice for a Caller Involved in a Powder Hazard (Biological Agent or Dry Chemical) Incident:**

  - If a suspected item or device is found, do not touch it or open it. Leave the item where it was found.
  - Do not use a 2-way radio within 300 feet of a suspected device.
  - Do not shake or empty the contents of a package or container.
  - If the powder is in a package or envelope place the item into a clear plastic bag if one is available. If not, carefully cover the package or envelope using clothing, trash can etc.
  - If the powder has spilled do not attempt to clean it up.
  - Take note of the color and texture of the powder.
  - Identify the location of the device, package, or envelope to include where the powder was spilled.
  - Avoid all contact with spilled powder.
  - Avoid any measures that will disturb the air around the powder. If fans are in use turn them off.
  - Shut down air conditioning and heating systems to reduce the spread of vapors throughout other parts of the building.
  - Evacuate the immediate area closing doors and windows to the room where the device, package or release is.
  - In the case of a known release, avoid the use of elevators to evacuate the area. Elevators create a significant amount of air pull and can pull the agent into the elevator shaft.
  - Direct people to stay away from structural doorways, exhaust vents, etc. where agent may be vented from an enclosed area.
  - Identify anyone that may have come in contact with the material. Have them wet down their clothing, remove their clothing and place it in a plastic bag. Wetting down the clothing reduces the chance of the agent aerosolizing when the clothes are removed. Seal the plastic bag using tape if necessary. Wash all exposed areas with soap and water.
  - Provide some form of modesty cover for those who disrobed. Use coats, tablecloths, or drapes etc. that were not in the area where the release or exposure occurred.
  - Keep potentially exposed people segregated from others to avoid any chance of cross-contamination.
  - Identify any potentially exposed persons who may have left the scene. Contact them and direct them to take precautions as listed above.
  - Keep all persons on the scene until the arrival of emergency responders.

9-1-1 Checklist

SUGGESTED 9-1-1 OPERATOR CHECKLIST

If you are a 9-1-1 operator, you should follow this checklist of questions when handling a report of a potential HAZMAT incident. Find out the following:

1. What is the location of the incident?

_____

2. Are people injured or sick? If so, how many victims are there and what are their symptoms?

_____

3. Is there a fire or was there an explosion?

_____

4. Approximately what time did the incident occur?

_____

5. What type of vehicle, container, or device is involved? (Have them describe any unusual markings on the vehicle, container, or device.)

_____

6. Do the markings indicate what the materials might be?

_____

7. Has anything spilled?

_____

8. Do you see smoke or a vapor cloud?

_____

9. Do you hear a bursting or hissing sound?

_____

10. Has anyone complained of an unusual odor?

_____

11. What are the weather conditions?

Temperature:_____

Wind Speed: _____

Direction: _____

Humidity: _____

12. Is there anyone else at the scene that may have knowledge of the situation?

_____

13. Where can responding units meet with the person reporting the incident?

_____

After taking this message and notifying responders, the 9-1-1 operator (if possible) should attempt to obtain weather information from his or her local weather officials (i.e., current barometric pressure, humidity, temperature, wind direction, wind speed, and forecast).

Barometric pressure:_____

Humidity:_____

Temperature: _____

Wind Direction: _____

Wind Speed: _____

Forecast:_____

The 9-1-1 operator should caution emergency responders regarding the protocol of a nuclear, biological, and/or chemical (NBC) incident.

Dispatcher's Role

If the 9-1-1 operators are separate from dispatchers in your system, it is imperative that the dispatchers receive all pertinent information to notify/dispatch all the necessary emergency response equipment needed at the incident. This information must also be relayed to all responding units. It is also crucial that all responding agencies are aware of each other's response.

■ Notifications

Dispatchers need to notify the following units and organizations:

- Fire
- Police
- Emergency Medical Services (EMS)
- Fire, EMS, and police shift supervisors
- HAZMAT team
- Office of Emergency Management (OEM)
- Local Federal Bureau of Investigation (FBI) office weapons of mass destruction (WMD) coordinator
- Local health department by reporting the following:
  - Agent information
  - Patient signs and symptoms
  - Number of casualties

Coordination should be made to ensure local hospitals are notified of the potential for receiving contaminated patients. Dispatchers, public health department, Emergency Operations Center (EOC), or other predetermined agencies may perform this function.

■ Communication

Dispatchers will need to update and communicate the following information to responding units:

- Any new information as it is available
- Special response routes of travel upwind and upgrade of the incident
- Special instructions or precautions (e.g., use of PPE, report to staging areas)
- Weather updates, wind direction, and speed
- Description of perpetrators and getaway vehicles
- Warnings of potential contamination and additional devices
- Information of found dissemination devices, packages, and envelopes
- Information regarding number of victims, their signs, and symptoms

Responding Unit Roles and Responsibilities

- **Actions En Route to the Scene**

Prior to arriving at the scene, responders will need to mentally and physically prepare themselves for the unknown and take several immediate steps to protect themselves while en route to the scene. Responders will be able to effectively perform rescue operations and scene management safely with proper precautions and protective equipment, including the following:

- Mentally performing an initial assessment of the current situation.
- Reviewing information from the area and assessing the likelihood that this might be a chemical or biological incident.
- Reviewing procedures, precautions, and potential hazards.
- Being aware of secondary devices purposely placed to injure first responders.
- Assessing the nature and description of the call. What is driving the response?
  - A call-in threat
  - An explosion
  - A suspicious package
  - Sick or injured people
- Deciding on the best possible route and access to the scene.
- Determining wind direction.
- Always expecting an airborne hazard is present and approaching the scene from upwind and upgrade, regardless of the incident description.
- Considering the best possible route into the incident starting at least two blocks from the incident.
- Observing plume direction.
- Stopping at least 500 yards away and collecting scene information before staging at the scene.
- Alerting follow-on responders of the situation.
- Taking into consideration that the perpetrator may still be on the scene (possibly one of the injured).
- Assessing the location of the incident scene or target, and whether the target is credible.
- Being aware of locations that tend to be favored targets for terrorists, which may include the following:
  - Large gatherings such as sporting, political, or public social events
  - Office high-rise buildings or government buildings

- Critical infrastructures such as the following:
  - → Information and communication
  - → Electrical power systems
  - → Gas and oil storage
  - → Banking and finance
  - → Water supply
  - → Public transportation
  - → Government services

■ Scene Arrival and Assessment Actions

The first officer on the scene needs to determine the nature and magnitude of the incident. The scene assessment is the first step in gaining control of the situation and protecting yourself and other responders. As it becomes increasingly likely that the incident involves BW/CW agents, the following actions should occur:

- Estimate the perimeter boundaries; it is best to overestimate in this type of incident.
- Identify perimeter entry and exit points, Incident Command Post (ICP), and staging areas. It is critical for control of the area to be established immediately upon verification of a valid agent threat or release.
- Conduct the initial information collection outside the building and at a safe distance from the scene.
- Question the person who received the threat. Information can be gathered that will assist you in determining the validity of the situation.
- Identify person(s) most knowledgeable of the incident and have them meet with you to provide details of the incident. This meeting should occur outside the potentially affected area.
- Quickly size up the incident assessing hazards and threats. The initial assessment will always be a balance between timeliness and thoroughness.
- Consider that terrorists could be among the victims or near the scene.
- Anticipate the possibility of multiple hazards such as multiple agents, secondary devices, or physical hazards resulting from an explosion.
- Stage your apparatus and other incoming units upwind and upgrade at least 300 feet away from the scene.
- If not already dispatched, request HAZMAT team, EMS, rescue, police, bomb squad, mutual-aid, and other resources.
- Consider what tactics and equipment will be needed to control the scene and provide protection. In most cases, victims will need to be removed from a Hot Zone to areas where decontamination, treatment, and counseling can begin. Measures to limit the spread of agent and potential for additional exposures must be considered.

- Identify those with greatest probability of exposure, such as victims who were near the dissemination sources or those who physically touched the suspected BW/CW item.
- Identify and isolate those potentially and actually exposed.
- Determine if there are injuries. If so, ascertain the estimated number, types of injuries, and location of the victims.
- Determine what protective measures are needed to prevent further exposure.
- Do not overlook the appearance and report of dead or dying animals. Many agents might first present in animals before they begin to affect people.
- Set up and stage the media for media control; media converging on the scene have the potential to distract and even hamper response operations. Additionally, the broadcast of partial or incorrect information can severely undermine a response effort.

- **Scene Tactical Operations**

  - Direct all personnel to at least use full PPE consisting of firefighter turnout gear and self-contained breathing apparatus (SCBA).
  - Determine best protective equipment if needed for entry, and decontamination based on suspected agent.

PPE Levels Are the Following:

- **Level A: Fully encapsulated suit with SCBA.**
- **Level B: Nonencapsulated suit with SCBA.**
- **Level C: Splash suit (tyvex coveralls) with an air-purifying respirator.**

- Establish and maintain accountability system for all personnel.
- Establish Incident Command System (ICS)/Incident Management System (IMS).
- Establish communications between all responding agencies.
- Secure and deny entry to area.
- Isolate the area and control potentially unexposed individuals from entering building or immediate areas.
- Advise those that are potentially contaminated not to leave the scene.
- Move uninvolved civilians to safe zones.
- Be suspicious of unusual containers, out-of-place containers, or containers that appear to have a powdery residue. The recognized "BioHazard" or Department of Transportation (DOT) chemical symbols on a discarded container label should draw attention and should be saved for evidence and determination/confirmation of an agent.

- If a device or secondary device is found:
  - Do not touch or disturb
  - Notify law enforcement and request bomb squad
  - Evacuate area around the device
- This is a crime scene. Do not disturb evidence.
- Avoid contact with liquids.
- If rescuer(s) come in contact with liquids, they will need to decontaminate immediately.
- Engineer control measures:
  - Contact building maintenance to determine where and how many heating ventilation and air-conditioning (HVAC) systems are being used and where all the ducts are in the system.
  - Consider whether to shut down the entire system versus a partial shut down. This is situation dependent and factors such as temperature and weather weigh heavily; when in doubt, shut the entire system down. As you figure out where the agent is, you can turn the system back on in zones.
- Identify and evaluate hazards.
- Never move or handle any suspect packages or items.
- Identify the location and condition of the package or device.
- Determine what additional resources are needed for scene control and hazard mitigation and identify where these resources may be obtained.
- In the event of a suspect item, ensure the immediate area is secured, close doors/ windows, back away, and establish Hot, Warm, and Cold Control Zones.
- If the caller has placed the letter/package in a container or bag, law enforcement officials should take custody of the letter/package.
- If the caller was unable to bag the letter or package, then fire department/HAZMAT personnel should enter the building in protective clothing to secure the letter/package. The following protective clothing is recommended:
  - Biological
    - → Tyvex suit (does not need to be splash resistant)
    - → Latex gloves
    - → Rubber/latex shoe covers
    - → Air purifying respirator with high-efficiency particulate air (HEPA) filter or P100 filter cartridge
  - Chemical
    - → Level A Gear
- Firefighters should double bag the letter/package and turn it over to law enforcement officials.
- Identify whether live victims remain in the area of attack.
- Communicate to the affected persons—provide instructions and address their critical concerns. This will help you gain control of the scene.

- Do not use radios or cellular telephones closer than 300 feet until an explosive hazard has been ruled out.
- Rescue live victims only. This is covered indepth under the Casualty Rescue section.
- Identify potential witnesses and coordinate with law enforcement.
- Contact appropriate health agencies.
- Establish water supply, hoselines, and suppression duties for decontamination and fire suppression.
- Establish casualty collection points (CCPs).
- Perform mass decontamination, triage, and treatment of victims.
- Monitor and maintain water runoff.

PLEASE NOTE:
The Environmental Protection Agency (EPA) issued a Chemical Safety Alert that stated "During a hazardous materials incident (including a chemical/biological agent terrorist event), first responders should undertake any necessary emergency actions to save lives and protect the public and themselves. Once any imminent threats to human health and life are addressed, first responders should immediately take all reasonable efforts to contain the contamination and avoid or mitigate environmental consequences." They also clarify this statement by stating "Contaminated runoff should be avoided whenever possible, but should not impede necessary and appropriate actions to protect human life and health. Once the victims are removed and safe from further harm and the site is secured and stable, the first responders should be doing everything reasonable to prevent further mitigation of contamination into the environment."

Additional information on the Chemical Safety Alert issued by the EPA on the concerns of rescuing victims and control of potentially contaminated runoff can be found in Reference Number 2, "First Responders' Environmental Liability Due to Mass Decontamination Runoff."

- **Perimeter Control and Hazard Zones**

  - Estimate boundaries (best to overestimate).
  - Establish outer and inner perimeters.
  - Establish entry and egress points.
  - Hot Zone is restricted to those who are contaminated.
  - Warm Zone is where victims are decontaminated.
  - Cold Zone is the staging and treatment area. There are no contaminated people or equipment in this area.

■ HAZMAT Team Special Considerations

Missions performed by HAZMAT teams during a chemical or biological incident will predominantly be the same as a normal HAZMAT response. However, a deliberate CW/BW attack will most likely yield many more casualties, occur in a densely populated area or a large gathering, and be a criminal act. HAZMAT operations must be closely coordinated with law enforcement.

- Approach upwind and upgrade of the incident.
- Wear Level A HAZMAT PPE/SCBA.
- Identify the chemical/biological agent using identification detection equipment and patient symptoms.
- Collect samples for laboratory analysis.
- Avoid contact with liquids. If contact is made with any liquids, responders will need to decontaminate immediately.
- Be alert for secondary devices. If a device is found, do not disturb and notify law enforcement immediately.
- Consider perpetrator may still be onscene.
- If not already done by first on-scene units, establish the following:
  - Communications with command post
  - Safety, Hot, Warm, and Cold Zones
  - Casualty holding area/CCPs
  - Technical decontamination for responders, evidence, equipment, and apparatus
- Provide air area monitoring during tactical operations.
- Provide equipment monitoring during recovery operations.

Casualty Rescue

The threat of cross-contamination of victims or responders through contact with liquid agent or residue continues even after the initial agent release. The rapid removal of casualties from the contamination, providing triage, and decontamination is essential to reducing additional agent-related injuries. Incident Commanders (ICs) must make rapid decisions on casualty rescue based on protective equipment available and an evaluation of the contamination threat. As many ambulatory casualties should be removed from the area as possible, without rescuers entering the incident site. Live, nonambulatory casualties should be expected at all CW/BW incidents.

- **Communication with Victims**
  - Attempt to talk to all victims.
    - Reassure them that, if they remain calm and follow your instructions, you will be able to help them.
    - Explain the process of receiving help.
    - Explain that leaving the scene might place them at further risk.
    - Attempt to keep them on the scene but out of the Hot Zone.
  - Use bullhorns and vehicle public address (PA) systems to give directions.
    - Instruct live ambulatory victims to evacuate.
    - Instruct ambulatory victims to evacuate live nonambulatory victims.
    - Instruct victims to shelter in place in a safe area if they cannot be evacuated.
- **Victims with Special-Needs Considerations**
  - Hard of Hearing victim(s) will require translation of all communication between victims and emergency responders. Responders must ensure special-needs victim(s) receive all communications.
  - Visually and physically handicapped victims will require assistance for evacuation or sheltering in place. Emergency responders must ensure all special-needs victim(s) are buddied with another victim or responder for assistance.
- **Determining if There Are Live Victims in the Contaminated Area**
  - Look through windows and open doors to determine if there are any live victims.
  - If live victim rescue is necessary, the IC should determine if rescue of victims will be conducted by using firefighter turnout gear and SCBA or if responders must wait for the arrival of HAZMAT teams with Level A protection.
  - If all victims are dead or dying, do not make a rescue attempt.
- **PPE Options for Rescuing Victims**

Firefighters by nature incur a certain degree of risk in the performance of their duties in an effort to save the lives of victims at an emergency response scene. In many instances

firefighters may arrive on the scene of an incident where numerous victims exhibit varying degrees of injury and illness. It may not be immediately recognizable that a chemical agent is the cause of the victim's distress. As such, firefighters possibly will enter a potentially hazardous environment in order to perform rescue of living victims wearing only their basic firefighter protective ensemble (structural turnout gear and SCBA).

Whenever firefighters are faced with a potential chemical incident response the first option for protection should be to wear certified chemical agent protective clothing and certified CBRN respirators. However, in certain emergency response situations the Incident Commander may find himself on the scene, faced with a casualty rescue mission, without certified chemical protective clothing. In these instances the Incident Commander must make a decision either to wait for response teams with certified chemical protective ensembles before performing victim rescue or to perform rescue operations using the available firefighter protective gear (turnout gear and SCBA). The risks associated with using turnout gear and SCBA to perform rescue of victims in a chemical warfare agent environment are outlined in the report *Risk Assessment of Using Firefighter Protective Ensemble with Self-Contained Breathing Apparatus for Rescue Operations During a Terrorist Chemical Agent Incident*, U.S. Army SBCCOM, August 2003. This report should be obtained and read in order for an Incident Commander to fully understand the complete risk assessment for performing this type of rescue operation.

Level A HAZMAT suit with SCBA provides the greatest level of protection to firefighters performing quick rescue, however performing rescue in level A poses the following issues.

- Initial responders to the scene may not have sufficient quantities of level A suits available to perform the magnitude of the rescue mission.
- The delay to wait for level A suits may cause additional casualties or worsening of the victims conditions due to increased exposure to the agent.

If a rescue operation with the protective equipment that is readily available (FFPE and SCBA) is performed, the operation should be minimized and should not exceed the constraints outlined in the Incident Commander's Operational Considerations (see below). Incident Commanders must be aware that there is a higher degree of risk to firefighters using FFPE and SCBA than there is to firefighters using certified CBRN protective clothing.

Incident Commander Operational Considerations

- The presence of **LIVING** victims inside the potential hazard area provides the basic indicator for firefighters to assess the level of nerve agent contamination.
- Rescue entry occurs after vapor concentration has peaked (assumed approximately ten minutes after the release of agent).
- Firefighters using standard turnout gear and SCBA to perform rescue of **KNOWN LIVE VICTIMS** can operate in a nerve agent vapor hazard for up to 30 minutes with minimal risks associated with nerve agent exposure.

- The risks associated with these 30-minute operations are that 50% of firefighters **MAY** experience increased sweating and muscle weakness 1-18 hours after exposure.
- Firefighters entering a nerve agent environment **WITHOUT KNOWN LIVE VICTIMS** using standard turnout gear and SCBA should limit their potential exposure to three minutes.
- Firefighters searching an enclosed area for victims should immediately exit the area and undergo decontamination if they encounter evidence of chemical contamination and cannot identify any living victims.
- If firefighters encounter oily liquid contamination (puddles/drops) and victims report signs of mustard agent (i.e. garlic odor), firefighters and victims should immediately exit the area and undergo decontamination.

Additional information on the use of protective gear for rescue operations can be found in Reference Number 10, "Risk Assessment of Using Firefighter Protective Ensemble with Self-Contained Breathing Apparatus for Rescue Operations During a Terrorist Chemical Agent Incident."

Note: The risks associated with entering a contaminated area in turnout gear with SCBA must be understood prior to making the decision to perform rescue operations.

- **Ventilation Needs**

  - Use positive pressure ventilation (PPV) fans to decrease the level of chemical agent vapors, thereby increasing the length of time responders can stay in the contaminated environment due to reduced concentrations of agent.
  - Consider the downwind hazard to unprotected victims before using PPV.
  - Use negative pressure for ventilation of closed interior rooms.

Additional information on the use of PPVs can be found in Reference Number 15. "Use of Positive Pressure Ventilation (PPV) Fans To Reduce the Hazards of Entering Chemically Contaminated Buildings."

- **Removal of Victims**

  - Avoid physical contact with victims. Stretchers and backboards may be used instead of carrying victims.

Note: Responders need to be aware that the closer they are to the point of dissemination of the agent, the more likely they are to expose themselves to liquid contamination. Additionally, responders should avoid contact with any of the deceased due to the threat of liquid contamination and because the deceased are part of the crime scene.

  - After victims are rescued, move them immediately to the decontamination area for decontamination.
  - Assist and direct all victims to the triage area.

Incident Command

■ Incident Command Operations

The decisions the IC makes during the first 10 to 15 minutes of the response are the key to both protecting responders and saving the lives of victims of the attack. The IC must be able to recognize critical needs of the incident and prioritize the limited resources available to perform them. The IC must have a thorough knowledge of CW/BW incident response procedures, threats, and dangers of the potential agents. It is critical for the safety of all personnel and the overall success of the response for all agencies to operate as a Unified Command, not a series of individual agency command posts.

- Establish the command post upwind and upgrade from direct involvement with victims, responders, or emergency response vehicles.
- Continually obtain updates on the following:
  - Incident progression
  - Estimated number of casualties
  - Location of Hot, Warm, and Cold Zones
  - Units and personnel in the Hot, Warm, and Cold Zones
  - Location of devices and secondary devices if found
  - Location of decontamination areas for both victims and responders
  - Federal agencies on the scene and those responding to the scene
- Determine the proper level of PPE for responders.
- Evaluate the chemical threat, potential to save lives, risk to responders, and time constraints to achieve each level of responder protection before determining what level of PPE to use to perform rescue operations.
- Activate the Unified Command System (UCS). Ensure proper notifications are made to the OEM, local law enforcement, local FBI office, threat assessment group, local health department, HAZMAT, and EMS. It is imperative to employ the UCS to ensure accountability and effectiveness of all personnel and resources.
- Request additional resources immediately and as needed.
- Establish a dedicated radio channel or direct telephone line with the Emergency Dispatch and Communications Center.
- Ensure there is a decontamination area for victims and another area for technical decontamination of responders, equipment, and evidence collection.
- Request communications and dispatch to notify hospitals of mass casualties and the possibility of contaminated victims who left the scene showing up at their facilities.
- Ensure the accountability of all responders onscene is maintained.
- Request the senior ranking law enforcement officer to report to the command post.
- Remind all sector chiefs to prompt all personnel that the incident is a crime scene and to use caution to preserve suspected evidence if possible.

- Coordinate rescue operations with law enforcement.
- Ensure law enforcement is advised and communicates regarding all activities conducted in the immediate area.
- Search for secondary devices with law enforcement officials.

Incident Command Communications

- Establish communications between the command post, ICS/IMS sectors, and all responding agencies.
- Command post communication considerations include the following:
  - Spare and replacement radios, batteries, chargers, and supplies.
  - Mutual-aid radios and frequencies for the ability to communicate with multiple agencies and jurisdictions.
  - Hardwired telephones to relieve use of radios.
  - Wireless cellular telephones that use separate networks from those of the public as an alternate to radio overload.
  - Hardwired or wireless fax machines to send and receive information and resource lists without being monitored or heard by others.
  - Vehicle or handheld computers to process incident information.
  - Private and business owned two-way radios may be used to relieve overloaded emergency radios.
  - Message runners in the event of loss of radio communications.
- Emergency Contact Telephone Numbers:
  - CHEMTREC: (800) 424-9300
  - National Response Center: (800) 424-8802
  - Centers for Disease Control and Prevention: (888) 232-3228
  - U.S. Public Health Service: (800) USA-NDMS
  - Department of Justice Office for Domestic Preparedness Helpline (202) 324-9025

Evacuation of Victims

In a large-scale incident, the IC needs to decide if an entire building, a city block, a community, and/or how much square mileage must be evacuated if needed. When dealing with only the immediate victims, a number of factors may influence the decision whether to evacuate, including the following:

- Threat assessment is the primary consideration. A likely place for a device to be located is the exterior of a building, which may increase danger to personnel.
- Another likely place to conceal a device is an area of public accessibility (e.g., hallways, lobbies, and restrooms).

- Evacuating personnel through public areas may increase the hazard.
- An alternative to total evacuation is partial evacuation, which is effective when the threat indicates the specific location of the device. Partial evacuation requires a high degree of coordination and planning. If a device is located, the area around the item as well as the rooms immediately above and below should be evacuated.

Things to consider during evacuation include the following:

- Assist police and EMS in evacuating victims.
- Define people at risk, while evacuating victims.
- Do not endanger or contaminate the healthy.
- Provide a clean route for victims to exit.
- Isolate the immediate area; do not allow unauthorized access in or out.
- Deny entry to nonessential personnel.
- Assign a fire safety officer to observe the entire scene.
- Partial versus total evacuation is agent and scenario dependent. Evaluate your needs; you may need to evacuate only a room or a floor or a zone of a building.
- Sheltering in place.
- Isolation—separation of nonexposed individuals from suspected or known exposed or infected victims should be initiated as soon as practically possible after the incident.

- **Sector Assignments**

  - Safety (Incident, HAZMAT, EMS)
  - EMS (Triage, Treatment, Transportation)
  - Water
  - HAZMAT (Hot, Warm, Cold)
  - Public Information Officer (PIO)
  - Decontamination
  - Accountability
  - Rehabilitation
  - Staging
  - Operations
  - Transportation (Multiple Agencies)

Special Considerations for EMS

■ Operations for EMS

The greatest challenge facing EMS in a known chemical/biological incident is the number of actual casualties from trauma and agent exposure. Segregating these casualties from non-exposed victims and asymptomatic possibly exposed (APE) victims will be difficult. Medical personnel must also perform triage and possibly provide minor medical intervention while in a potentially contaminated environment (Warm Zone).

The IC will need to determine the proper level of PPE and respiratory protection for EMS personnel in their assigned work areas.

PPE recommended for EMS operating in the Warm Zone consists of either turnout gear with SCBA or Level C consisting of tyvex style overgarments, boots, gloves, and full-face powered air purifying respirators (PAPRs) with hoods or full-face negative pressure respirators with hoods.

EMS personnel will need to do the following:

- Be alert for secondary devices and perpetrators. If a device or perpetrator is found, notify law enforcement officials immediately.
- Avoid contact with liquids. If responders come in contact with liquids they will need to decontaminate immediately.
- Establish patient identification and tracking.
- Coordinate with law enforcement on disposition of victim personal property.
- Turn personal property over to law enforcement for security.
- Establish communications with the command post and hospitals.
- Establish staging for EMS personnel, ambulances, supplies, and resources.
- Coordinate with fire personnel and the command post on location of the CCP.

■ Patient Care Issues

EMS providers will need to handle a CW/BW incident as a mass casualty incident (MCI). The biggest caveats will be the possibility of enormous numbers of victims and the need for all victims to be decontaminated prior to being treated. EMS providers will need to do the following:

- Provide rapid prioritization to a massive amount of patients.
- Triage victims based on medical necessity.
- Follow MCI protocols.
- Follow the Simple Triage and Rapid Treatment (START) System.

- **Patient Segregation**

Victims of a CW/BW incident need to be evaluated by determining their priority for decontamination, based on their medical condition (standard MCI triage protocols) as well as their likelihood of contamination. Separate patients using the following categories:

- Ambulatory casualties, who are able to understand directions, talk, and walk unassisted.
- Nonambulatory casualties who are unconscious, unresponsive, or unable to move unassisted.

All patients need to be identified and tracked by using a tagging or marking system that coincides with written patient data prior to decontamination. Using the START System, the highest priority for overall decontamination will be those casualties who are medically triaged as immediate (i.e., red tag, red ribbon, or priority 1) and are in need of immediate life-saving medical procedures that can be done quickly with the medical resources available onsite. Usually, these casualties have breathing or circulatory problems but may also include those victims with severe nerve agent poisoning who need antidote or ventilation immediately. Severely intoxicated nerve agent casualties may be the highest priority for decontamination within this category. For these casualties, decontamination and treatment completed as soon as possible after exposure may be lifesaving.

Depending on local protocols, responders in the Hot Zone may perform some treatments, such as Mark I antidote injections. Responders may need to recategorize victims in a chemical terrorist event. Those victims who are nonambulatory priority 1 red may need to be tagged as black priority 4 nonviable victims. If these victims have not received Mark I kit treatment and decontamination within 5 minutes of exposure **and if they are suffering from severe agent symptoms,** their chances of survival, regardless of what type of medical intervention is provided, is slim.

The next priority for nonambulatory decontamination are those casualties medically triaged as delayed (i.e., yellow tag, yellow ribbon, or priority 2). These casualties may have serious injuries and require definitive care but can wait for a short period of time without compromising the outcome (e.g., a victim with a fractured lower leg). These victims may also have mild exposure to chemical agent vapor or liquid, but not a life-threatening dose.

Priority 3 victims, those with no known or suspected exposure to any chemical contamination, follow treatment of priority 2 victims. The lowest priority for overall decontamination are those casualties medically triaged as expectant (i.e., black tag, black ribbon, or priority 4) as discussed above.

Nonambulatory victims triaged as immediate are higher priority than the ambulatory victims triaged as immediate. It is recommended that the remaining casualties are processed in the same manner, with nonambulatory victims being decontaminated before ambulatory victims. Due to the complex nature of some of these casualties (i.e., mixed chemical and conventional casualties), the medical triage and decontamination sectors should work closely to maximize

their collective sorting and management of casualties. A flow chart for this is depicted in **Figure 2.**

For further information regarding special considerations for EMS personnel, please refer to Reference Number 11, "Guidelines for Mass Casualty Decontamination During a Terrorist Chemical Agent Incident."

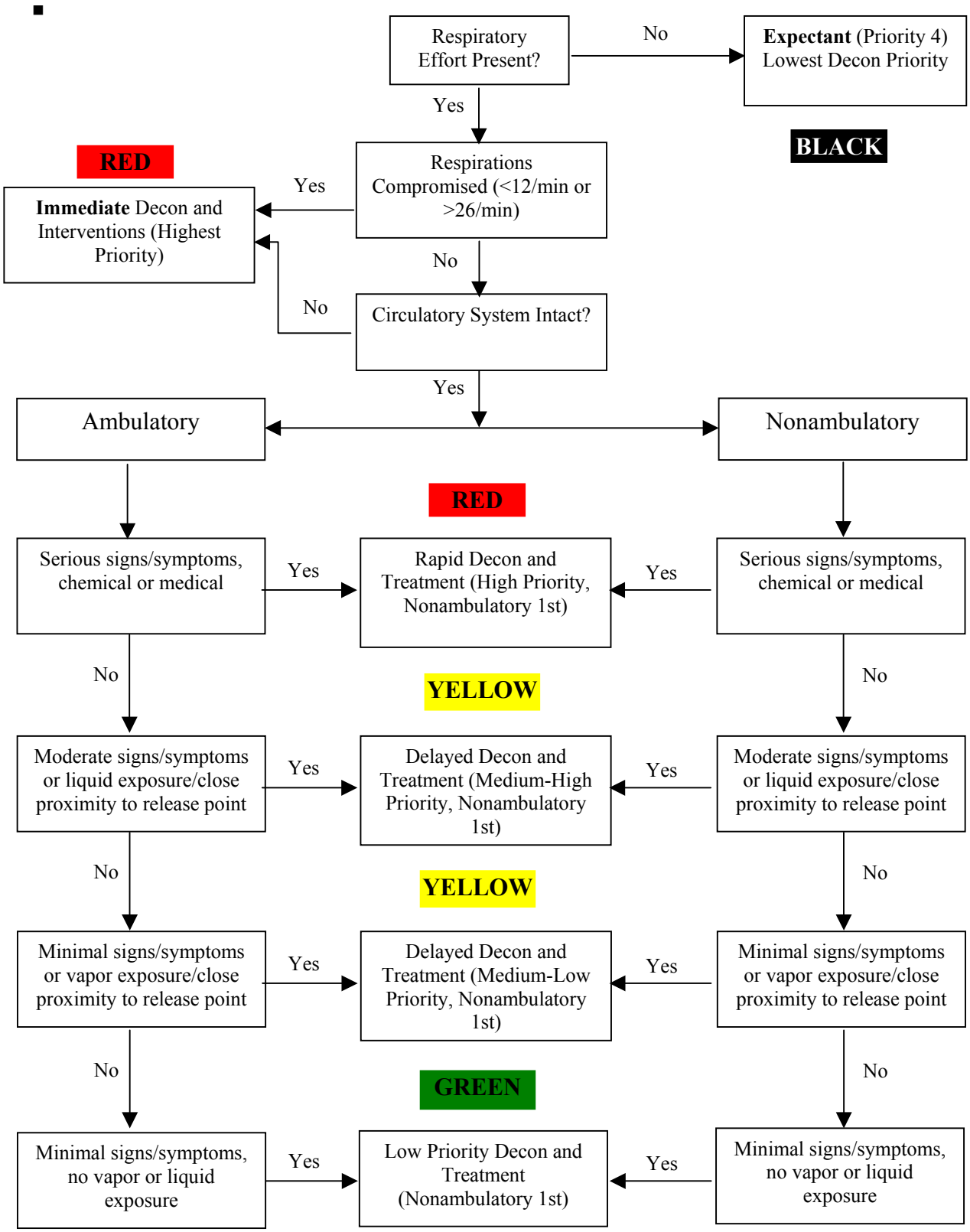

Figure 2. Mass-Casualty Decontamination Algorithm

■ Transportation Issues

Due to the immense number of victims injured, exposed, or APE, many victims may not be transported using traditional methods, such as ambulances, and may not even be transported to traditional medical facilities such as hospitals. EMS providers will need to do the following:

- Establish a transportation area.
- Direct walking wounded and APE to a designated on-site CCP.
- Only transport those casualties who have undergone gross decontamination onsite.
- Transport yellow- and red-tagged triage patients to a medical treatment facility using emergency medical transports.
- Transport green-tagged triage patients either to alternative care facilities, if established, or traditional medical facilities using mass transit assets.
- Accompany each transport as required.

Level C PPE, and the training associated with it, is recommended for transport drivers and accompanying personnel. It consists of full-face, negative pressure respirator, full body chemical suit (tyvex or charcoal lined), chemical, and/or biological protective gloves.

■ Hospital Notification

Community medical systems are faced with managing two principal populations when treating victims from a chemical or biological incident: those transported from the incident scene and those who self-refer. In the case of the Tokyo subway sarin attack, most people seeking medical attention self-referred. Effective hospital support and patient care require timely notification of the incident and subsequent updates on the identity of the suspected agent until positive identification is achieved. Treatment protocols for victims exposed to suspected agents should be reviewed as agent identity becomes available. The hospital emergency department (ED) should receive notification of the incident as soon as possible. The ED will need the following:

- An estimated number of casualties
- Awareness of the possibility of self-referrals and their need for decontamination
- Details of decontamination procedures that were used on the scene
- Current information on the suspected agent(s)
- Available advice on treatment protocols
- Cautionary advice on necessary protective measures

PPE recommended for hospital personnel performing decontamination operations, casualty care, and triage prior to decontamination should be Level C protection consisting of a tyvex type suit with integrated hood (not charcoal lined suits) and foot/shoe covers; full-face, negative pressure respirator; butyl rubber gloves; and rubber overboots.

- **Alternative Care Facilities**

After evaluation of the impact of casualties on the medical system, a decision to open an alternative treatment center may be made by the IC, public health officer, and emergency manager.

- **Off-Site Triage, Treatment, and Transportation Center (OST^{3}C)**

  There may be a large number of people at a chemical incident who are not exposed to the agent but will still seek some form of treatment. To allow the existing medical system to provide care for those who need it most, an OST^{3}C may be established. Those victims that are not seriously injured or feel they have been exposed but are asymptomatic will need to be transported or referred to this facility.

- **Neighborhood Emergency Help Center (NEHC) and Acute Care Centers (ACCs)**

  Existing medical facilities should expect to become rapidly overwhelmed from the victims of a BW attack. There may be a large number of patients who are not injured or sick but possibly exposed, including all the first responders that will need to receive prophylactic antibiotics. To manage the additional caseloads, communities may seek to establish alternative forms of medical care facilities, which may include an NEHC that provides assessment and treatment of the noncritical victims and an ACC for victims who have become critically ill from the agent.

Further information on alternative care facilities can be found in Reference Number 5, "An Alternative Health Care Facility: Concept of Operations for the Off-Site Triage, Treatment, and Transportation Center (OST³C)," reference number 14, "Neighborhood Emergency Help Center a Mass Casualty Care Center for Biological Terrorism Incidents," and reference number 13, the "Interim Planning Guide: Improving Local and State Agency Response to Terrorist Incidents Involving Biological Weapons."

Decontamination

■ Decontamination Personnel Roles

For decontamination to be beneficial to the exposed victims of chemical/biological incidents, it must be performed within minutes of the agent exposure. However, decontamination at any time after any exposure is necessary to reduce the hazards to responders and other victims posed by residual agents on the clothing or skin. Studies have looked at the advantages of using soaps, detergents, and bleach in the decontamination process; however, the only decontaminant expected to be immediately available to the first responder is water. The theories and procedures referred to by the CWIRP are based on decontaminating victims using large volumes of water.

Complete mass casualty decontamination information can be obtained in Reference Number 11, "Guidelines for Mass Casualty Decontamination During a Terrorist Chemical Agent Incident."

Aspects of decontamination for a CW/BW incident are the following:

- Segregate victims and coordinate decontamination prioritization with the fire department and HAZMAT based on the following:
  - Triage categorization.
  - Likelihood of agent exposure.
- Persons known or suspected of physical contact with a suspected chemical/biological agent should wash with copious amounts of soap and water at the earliest opportunity.
- Potentially contaminated clothing should be removed as soon as practical and double bagged, labeled, and given to law enforcement officials as potential evidence.
- Establishment of decontamination locations upwind and upgrade of the incident.
- Decontamination personnel must wear PPE and SCBA, or other air purifying respirators.
- Firefighters—recommended turnout gear with SCBA or Level C.
- EMS for treatment of victims prior to decontamination—recommended turnout gear is with SCBA or Level C.
- Police if needed to assist—recommended Level C.
- Protection against secondary exposures by the following:
  - Decontaminating.
  - Covering open wounds and sores before and after decontaminating.
  - It should be noted that very few biological agents pose a hazard for secondary transmission.
- Need for police to provide security of personnel, victims, personal property, and collection and preservation of evidence.

- Avoid contact with unknown liquids.
- **Immediate** decontamination of casualties with liquid contamination on their skin or clothing.
- Clothing removal is decontamination. Encourage victims to remove clothing at least down to their undergarments.
- Coordination of decontamination with EMS triage and treatment activities.
- Bagging and tagging personal belongings.
- Security of personal property and clothing.
- Separation of males and females.
- Children under the age of 10 should go in with their parents.
- Physically and mentally handicapped persons should go in with a same-sex fire-fighter or assigned buddy.
- Decontamination Prioritization:
  - Prioritize asymptomatic, symptomatic, and nonambulatory casualties.
  - Casualties closest to the point of release.
  - Casualties with reported exposure to vapor or spray.
  - Casualties with liquid agent contamination to clothing or skin.
  - Casualties with serious medical symptoms such as shortness of breath and chest tightness.
  - Casualties with conventional injuries.
  - Casualties with no visible signs or symptoms of agent exposure and no conventional injuries.
- Establishment of separate technical decontamination for responders away from mass casualty decontamination.
- Runoff control is necessary for decontamination of equipment and deceased.

Note: Decontamination of victims is a life-saving function and takes priority over control of water runoff.

For further information regarding water runoff, please refer to Reference Number 2, "EPA's Chemical Safety Alert."

- Notification of the health department and EPA
- Decontamination corridors are ideal targets for secondary devices
- Victim identification and tracking
- Method of water application
- Large quantities of water can be provided with the following:
  - Handheld hoselines
  - Aerial towers

- Decontamination may be performed by using the following:

  - **Ladder Pipe Decontamination System (LDS)**
    The LDS provides a large capacity shower of high-volume, low-pressure water spray. Ladder pipes, wagon pipes, monitor nozzles, and 22" fog nozzles attached to pump dischargers and other fire apparatus (i.e., fire engines or trucks) are positioned strategically to create decontamination corridors for large quantities of exposed people to travel through. Once the decontamination corridor is formed, the objective is to spray water from every feasible direction. A single LDS is comprised of two engines (also creating the corridor) that provide water spray from both sides using hoselines and deck guns, while the ladder pipe provides a high-volume, low-pressure flow from above. Multiple LDS' employ more than one ladder pipe to increase the decontamination corridor length to accommodate extremely large groups of victims. Multiple corridors can be established for ambulatory or nonambulatory victims; victims are woven through multiple overhead sprays. **Figure 3** demonstrates the layout of the LDS.

  - **Emergency Decontamination Corridor System (EDCS)**
    The EDCS uses fire apparatus, ladders, and salvage covers to create a privacy barrier and corridors for decontaminating victims. Two pumpers are positioned approximately 20 feet apart and parallel to each other. Three ladders (or ropes) are placed across and secured to the top of each pumper. Another ladder is centered atop and perpendicular to the three ladders and secured. Two nozzles are secured to this ladder and allowed to hang into the corridors. Salvage covers are attached to, or draped over, the ladders (or ropes) to provide two separate corridors. It may be noted that, although ropes serve the purpose, it is difficult to tie them with enough tension to hold up the covers without sagging. Water from the two nozzles is used to shower victims as they pass through the corridors. Plastic cable ties may be used to secure the covers and nozzles to the ladders. **Figure 4** demonstrates the layout of the EDCS for ambulatory and nonambulatory victims.

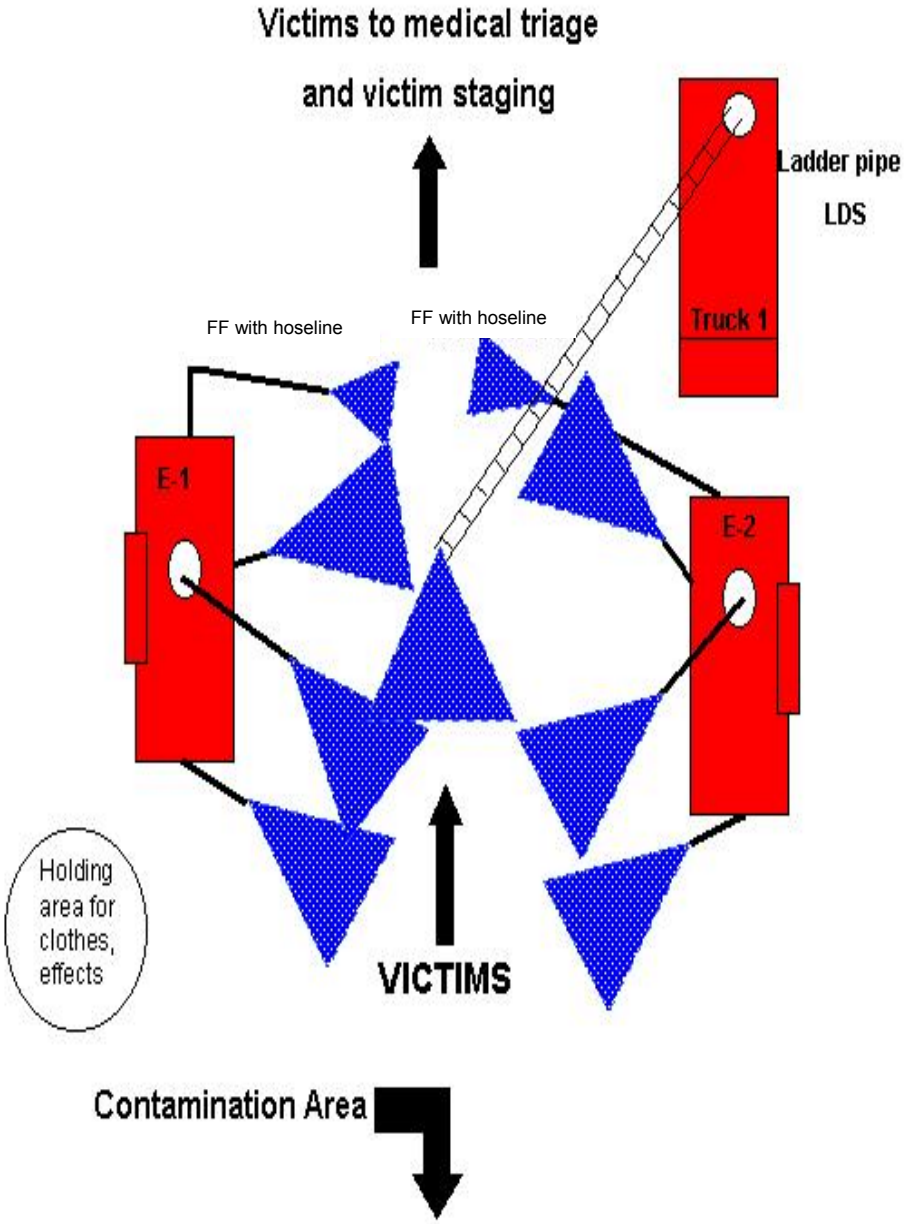

Figure 3. Ladder Pipe Decontamination System

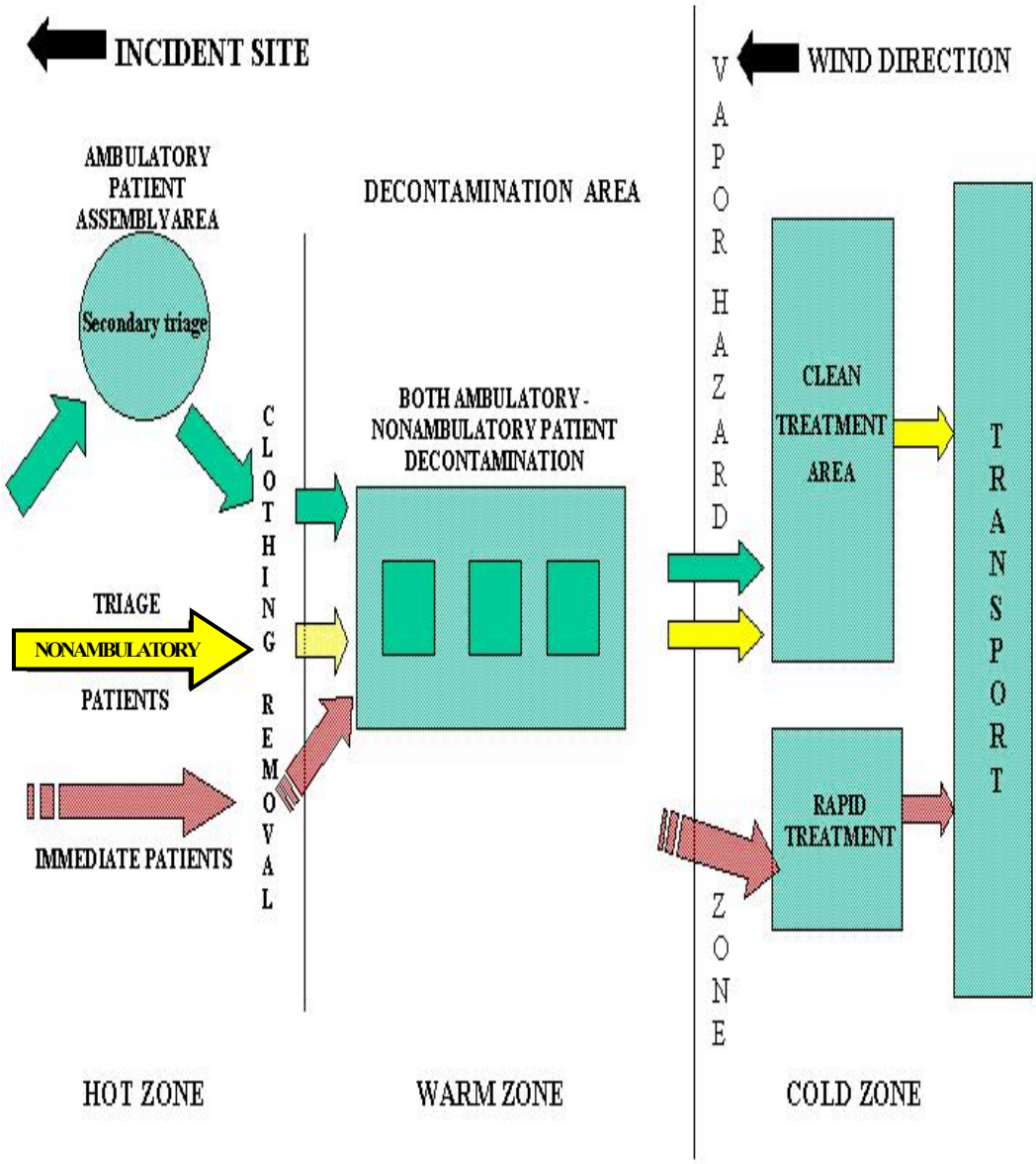

Figure 4. Emergency Decontamination Corridor System

- **Decontaminants**

  - Clothing removal
  - Dirt
  - Baking powder
  - Charcoal
  - Flour
  - Sawdust
  - Silica gel
  - Soap and water
  - Water (only)
  - Bleach (equipment decontamination)

- **Decontamination Resource Needs**

  - Engine companies for establishing, maintaining, and applying water supply, and for providing tarps and covers for decontamination systems.
  - Truck companies for ladder pipe and ventilation duties.
  - Ambulances and EMS personnel for treatment and transport of victims after decontamination.
  - Police and other law enforcement for establishing and maintaining security and control.
  - Dry clothing and blankets for victim protection and care.
  - Interim crews for relief of emergency personnel.
  - Department of Public Works (DPW) for traffic control devices, sandbags, and equipment.

- **Technical Decontamination**

Technical decontamination refers to the detailed decontamination (e.g., wash, rinse, underlying procedures) used by specialized teams, most notably HAZMAT, and is associated with removal of PPE. It is recommended at least one technical decontamination area be set up to support the special response teams that operate in the Hot and Warm Zones. The following personnel should be decontaminated separate from Mass Casualty Decontamination:

  - Firefighters
  - EMS providers
  - HAZMAT technicians
  - Bomb squad

- Law enforcement and investigative teams
- Civilian workers
- Collected evidence
- Response equipment

Note: Water should not be used to decontaminate permeable protective clothing, such as the military charcoal suits that law enforcement may wear. This type of clothing should be carefully removed to avoid exposing the wearer to the outside of the clothing. The wearer should be decontaminated with water after removing the protective clothing.

- **Cold Weather Decontamination**

When victims have been exposed to a known life-threatening level of chemical contamination, they should disrobe, undergo decontamination (with copious amounts of high-volume, low-pressure water or an alternative decontamination method), and be sheltered as soon as possible, regardless of the ambient temperature.

When victim contamination is less certain, and when time permits, decontamination processes can be altered to lessen victim discomfort. The following are guidelines:

- When the ambient temperature is 65 °F and above, disrobing, water decontamination, and post-decontamination processing can proceed outdoors.
- When the ambient temperature is greater than 35 °F and less than 65 °F, disrobing and water decontamination can proceed outdoors but, after showering, victims should be moved into a heated shelter.
- When the ambient temperature is 35 °F or below, disrobing, water decontamination, and post-decontamination processing should take place in heated shelters.

For further information on cold weather decontamination, please refer to Reference Number 9, Guidelines for Cold Weather Mass Decontamination During a Terrorist Chemical Agent Incident.

References

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Glossary of Acronyms

ACC	Acute Care Center
APE	Asymptomatic Possibly Exposed
BW	Biological Weapons
BWIRP	Biological Weapons Improved Response Program
CCP	Casualty Collection Point
CDC	Centers For Disease Control and Prevention
CP	Command Post
CW	Chemical Weapons
CWIRP	Chemical Weapons Improved Response Program
DoD	Department of Defense
DOT	Department of Transportation
DPP	Domestic Preparedness Program
DPW	Department of Public Works
ED	Emergency Department
EDCS	Emergency Decontamination Corridor System
EMS	Emergency Medical Services
EOC	Emergency Operations Center
EPA	Environmental Protection Agency
FBI	Federal Bureau of Investigation
HAZMAT	Hazardous Materials
HEPA	High-Efficiency Particulate Air
HIV	Human Immunodeficiency Virus
HVAC	Heating Ventilation and Air-Conditioning
IC	Incident Commander
ICP	Incident Command Post
ICS	Incident Command System

Section XII – Glossary of Acronyms

IMS	Incident Management System
IRP	Improved Response Program
LDS	Ladder Pipe Decontamination System
LE	Law Enforcement
MCI	Mass Casualty Incident
NBC	Nuclear, Biological, and/or Chemical
NEHC	Neighborhood Emergency Help Center
OEM	Office of Emergency Management
OST^3C	Off-Site Triage, Treatment, and Transportation Center
PA	Public Address
PAPR	Powered Air Purifying Respirator
PIO	Public Information Officer
PPE	Personal Protective Equipment
PPV	Positive Pressure Ventilation
SBCCOM	Soldier and Biological Chemical Command
SCBA	Self-Contained Breathing Apparatus
START	Simple Triage and Rapid Treatment
UCS	Unified Command System
WMD	Weapons of Mass Destruction