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# Multi-Casualty Mass Decontamination Guidance Document For First Responders



[www.oes.ca.gov](http://www.oes.ca.gov)

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# Acknowledgements

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# Preface

The Multi-Casualty Mass Decontamination Guidance Document is intended to assist local First Responders in planning and training for multi-casualty mass decontamination at or away from the site of a hazardous materials incident. This guidance document is intended to supplement and not take the place of an existing plan.

# **MULTI-CASUALTY MASS DECONTAMINATION GUIDANCE DOCUMENT FOR First Responders**

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# CHAPTER ONE

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## Introduction

The Governor's Office of Emergency Services has the responsibility for coordinating state resources in response to major events where public safety and health are an issue. Recent chemical incidents involving multi-casualties and the increased threat of terrorist activities involving hazardous materials have increased the need for a more coordinated pre-planned emergency response action to effectively mitigate an incident involving multi-casualties and the need for mass decontamination. Although, the issue of decontaminating large numbers of people is not new, it has become more visible with the recent evolution in response to Weapons of Mass Destruction (WMD).

The purpose of the Multi-Casualty Mass Decontamination Guidance Document is to provide local First Responders information to assist them in developing their own Multi-Casualty Mass Decontamination plans and training programs.

The document:

- Provides a basic background of Standardized Emergency Management System (SEMS) and its field response level, including the identification of Command Staff and HazMat/Multi-Casualty Operation ICS positions and responsibilities, as defined in the FIRESCOPE Fire Service Field Operation Guide;
  - Provides information on Cultural Sensitivity, Positive Communication, Protecting the Victims Modesty, and Handling Personal Items;
  - Describes HazMat agents' (chemical, biological, radiological) acute exposure effects, and provide triage and decontamination guidance; and
  - Describes decontamination basics.
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# CHAPTER TWO

## STANDARDIZED EMERGENCY MANAGEMENT SYSTEM (SEMS)

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### Introduction

This chapter provides a basic background of SEMS and its field response level, including the identification of Command Staff and HazMat/Multi-Casualty Operation ICS positions and responsibilities, as defined in the FIRESCOPE Fire Service Field Operation Guide.

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### SEMS Background

As a result of the October 1991 Oakland Hills fire, attention was drawn to the need for improving coordination among First Responders. In response, the legislature passed Senate Bill 1841, which became effective January 1, 1993. The law is found in Section 8607 of the California Government Code.

The statute directed the Governor's Office of Emergency Services (OES), in coordination with other state agencies and interested local emergency management agencies, to establish SEMS by regulation. The SEMS regulations took effect on December 1, 1996.

### SEMS Purpose/Scope

The basic framework of SEMS incorporates the use of the Incident Command System (ICS), Inter-Agency coordination, and the State's Master Mutual Aid Agreement and mutual aid program.

SEMS provides for a five level emergency response organization, activated as needed, to provide an effective response to emergencies involving multiple agencies or jurisdictions.

The use of SEMS facilitates:

- The flow of emergency information and resources within and between involved agencies at all SEMS organizational levels.
- The process of coordination between responding agencies.
- The rapid mobilization, deployment, use, and tracking of resources.

SEMS is designed to be flexible and adaptable to the varied emergencies that can occur in California, and to meet the emergency management needs of all responders.

By law, State agencies must use SEMS when responding to emergencies involving multiple jurisdictions or agencies.

Local governments are strongly encourage to use SEMS, and they must use SEMS in order to be eligible for state funding of response related personnel costs.

SEMS is a management system. It is based on a proven system that has been in use for over twenty years. SEMS provides an organizational framework and guidance for operations at each level of the State's emergency management system. It provides the umbrella under which all response agencies may function in an integrated fashion.

## **SEMS Four Components**

The four primary components within SEMS are:

### 1. The Incident Command System (ICS)

ICS was developed as a part of the FIRESCOPE program, (Firefighting resources of California Organized for Potential Emergencies), during the 1970's, by an inter-agency working group representing local, state and federal fire services in California.

After field tests, ICS was adopted by the fire services in California as the standard all hazards response system. ICS also has been adopted nationally by the federal land management agencies as the standard for response to all wildland fires.

### 2. Multi-agency Coordination

Multi-agency coordination as it applies to SEMS, means the participation of various agencies and disciplines involved at any level of the SEMS organization working together in a coordinated effort to facilitate decisions for overall emergency response activities, including the sharing of critical resources and the prioritizations of incidents.

The cooperative and collaborative working relationship between police, fire, public works, and parks departments in an Emergency Operations Center (EOC) is an example of Multi-agency Coordination as intended in SEMS. A Another example would be the collaborative operational coordination that might occur between municipal police, county sheriff, California Highway patrol, and National Guard elements that are involved in the same response.

### 3. Mutual Aid

A Master Mutual Aid Agreement in California was originally signed in 1950. Under this agreement, cities, counties and the State joined together to provide for a comprehensive program of voluntarily providing services, resources and facilities to jurisdictions when local resources prove to be inadequate to cope with a given situation.

Written mutual aid plans and operating procedures have been developed for several discipline specific mutual aid systems that function on a statewide basis within the Master Mutual Aid Agreement. Examples of these are fire and law enforcement.

#### 4. Operational Areas

An Operational Area is one of the five organizational levels in SEMS. An Operational Area consists of a county, and all the political subdivisions within the county area. The governing bodies of each county and of the political subdivisions in the county shall organize and structure their operational area. The county will be the lead agency for the operational area unless another arrangement is established by agreement. Overall responsibility for the formation of the Operational Area rests with the Chairman of the Boards of Supervisors in each county.

Operational Areas facilitate the coordination of resources between its member jurisdictions. Operational Areas also serve as a communication and coordination link between the Region and State level EOCs and local government EOCs within the Operational Area

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### **SEMS Five Organizational response Levels**

The SEMS five organizational response levels are:

- Field.
- Local Government.
- Operational Area.
- Region.
- State.

The following is a brief description of each level:

#### 1. Field Response Level

The field response level is the level where emergency response personnel and resources carry out tactical decisions and activities under the command of an appropriate authority in direct response to an incident or threat.

Incidents occur locally at this level and are managed locally until such time as capabilities and resources have been exceeded.

SEMS regulations require the use of ICS at the field response level of an incident

#### 2. Local Government Level

Local governments include cities, counties, and special districts. Local governments manage and coordinate the overall emergency response and recovery activities within their jurisdiction.

In SEMS, the local government emergency management organization and its relationship and connections to the Field Response level may vary depending upon factors related to geographical size, population, function, or complexity.



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### 3. Operational Area Level

Under SEMS, the Operational Area means an intermediate level of the state's emergency services organization, which encompasses the county and all political subdivisions located within the county. The Operational Area manages and/or coordinates information, resources, and priorities among local governments within the operational area, and serves as the coordination and communication link between the local government level and the regional level.

It is important to note, that while an operational area always encompasses the entire county area, it does not necessarily mean that county government itself manages and coordinates the response and recovery activities within the county. In most cases, the county EOC will function as both the Operational Area EOC and the EOC for the county.

The governing bodies of the county and the political subdivisions within the county make the decision on organization and structure within the Operational Area.

### 4. Regional Level

Because of its size and geography, the state has been divided into six Mutual Aid Regions. The purpose of a mutual aid region is to provide for the more effective application and coordination of mutual aid and other emergency related activities. The Office of Emergency Services (OES) provides administrative oversight over the mutual aid regions through three Administrative Regional Offices.

In SEMS, the regional level manages and coordinates information and resources among operational areas within the mutual aid region, and also between the operational areas and the state level. The regional level also coordinates overall state agency support for emergency response activities within the region.

### 5. State level

The state level of SEMS operates the State Operations Center at OES Headquarters in Sacramento. It is responsible for coordinating resource requests and resolving priority issues that might arise at the region level, between the three OES Administrative Regions.

The State Operations Center is also responsible for coordinating with FEMA and other federal agencies involved in the implementation of the Federal Response Plan in California.

## Five SEMS Functions

The table below provides a brief summary of the titles and definitions of activities associated with the five SEMS functions at all SEMS levels.

<b>PRIMARY SEMS FUNCTION</b>	<b>FIELD RESPONSE LEVEL</b>	<b>EOCS AT OTHER SEMS LEVELS</b>
Command/ Management	Command is responsible for the directing, ordering, and/or controlling of resources.	Management is responsible for overall emergency policy and coordination.
Operations	The coordinated tactical response of all field operations in accordance with the Incident Action Plan.	The coordination of all jurisdictional operations in support of the response to the emergency in accordance with the EOC Action Plan.
Planning/ Intelligence	The collection, evaluation, documentation, and use of information related to the incident.	Collecting, evaluating, and disseminating information and maintaining documentation relative to all jurisdiction activities.
Logistics	Providing facilities, services, personnel, equipment, and materials in support of the incident.	Providing facilities, services, personnel, equipment, and materials in support of all jurisdiction activities as required.
Finance/ Administration	Financial and cost analysis and administrative aspects not handled by the other functions.	Broad fiscal and recovery responsibility as well as overall fiscal accountability.

## SEMS Training and Guidelines

The SEMS Approved Course of Instruction as well as the SEMS Guidelines may be obtained from the California Specialized Training Institute (Governor's Office of Emergency Services, Training Branch), or through the OES Web site at <http://www.oes.ca.gov/>

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## Chapter Two Remaining Contents

The remainder of this chapter will focus on the:

- Command Staff and Operations ICS Structure.
- Description of Key Positions of the ICS Command Staff and Operations.
- Field Level HazMat Operation ICS Operation ICS Structure
- Description of Field Level HazMat Operation Positions.
- Field Level Multi-Casualty Operations ICS Structure.
- Description of Field Multi-Casualty Operations Positions.

All ICS forms and position responsibilities can be obtained from [www.firescope.org](http://www.firescope.org). For more education on the other three functions, please refer to the previous section "SEMS Training and Guidelines".

**SEMS does not specify the organizational components of a local hazardous materials incident. FIRESCOPE'S FIRE SERVICE FIELD OPERATIONS GUIDE charts that follow depict examples of hazardous materials ICS structures. Remember, as the incident unfolds, the field level incident command structure may grow depending on the incident's conditions. Initially, one person may be responsible for more than one position.**

**The incident command can become a unified command structure.** In ICS, Unified Command is a unified team effort which allows all agencies with responsibility for the incident, either geographical or functional, to manage an incident by establishing a common set of incident objectives and strategies. This is accomplished without losing or abdicating agency authority, responsibility or accountability.

Unified command may be implemented due to the following situations:

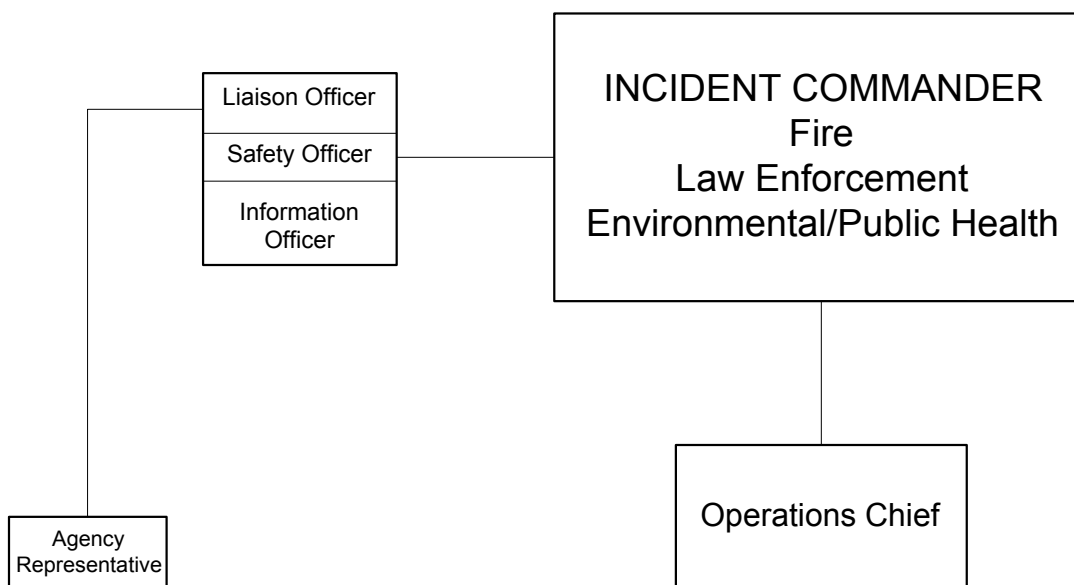
1. Incidents that have single jurisdiction involvement, but with multi-agency responsibility, or
  2. Incidents that have multi-jurisdiction and multi-agency involvement.
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## Command Staff and Operations Chief ICS Structure

The following chart depicts the Command Staff and Operations Chief structure as described in FIREScope's FIRE SERVICE FIELD OPERATIONS GUIDE, ICS 420-1, INCIDENT COMMAND SYSTEM PUBLICATION. Since decontaminating large numbers of victims, who have been or may have been contaminated by a hazardous material, will involve many different agencies having jurisdictional authority, a unified command approach is presented rather than an incident command.

### UNIFIED COMMAND



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## Description of Command Staff and Operations Chief Positions

Command Staff and Operation Chief positions are listed below with their responsibilities as described in the FIRESCOPE'S FIRE SERVICE FIELD OPERATIONS GUIDE ICS 420-1 INCIDENT COMMAND SYSTEM PUBLICATION.

## Positions

A number of responsibilities are common to all units in all parts of the ICS organization. The following is a checklist applicable to all ICS personnel.

### ► Common Responsibilities – All Positions

- a. Receive assignment from your agency, including:
  1. Job assignment, e.g., Strike Team designation, overhead position, etc.
  2. Resource order number and request number.
  3. Reporting location.
  4. Reporting time.
  5. Travel instructions.
  6. Any special communication instructions, e.g. travel frequency.
- b. Upon arrival at the incident, check in at designated Check-in location, Check-in may be found at:
  1. Incident Command Post.
  2. Base or camps.
  3. Staging Areas.
  4. Helibases.
  5. If you are instructed to report directly to a line assignment, check in with the Division/Group Supervisor.
- c. Receive briefing from immediate supervisor.
- d. Acquire work materials.
- e. Conduct all tasks in a manner that ensures safety and welfare of you and your co-workers.
- f. Organize and brief subordinates.
- g. Know your assigned frequency(ies) for your area of responsibility and ensure that communication equipment is operating properly.
- h. Use clear text and ICS terminology (no codes) in all radio communications. All radio communications to the Incident Communications Center will be addressed: "(Incident Name) Communications" e.g., "Webb Communications."
- i. Complete forms and reports required of the assigned position and send through supervisor to Documentation Unit.
- j. Respond to demobilization orders and brief subordinates regarding demobilization.

## ► Incident Commander

(ICS 220-1) The Incident Commander's responsibility is the overall management of the incident. On most incidents, a single Incident Commander carries out the command activity, however, Unified Command may be appropriate. The Incident Commander is selected by qualifications and experience.

The Incident Commander may have a deputy, who may be from the same agency, or from an assisting agency. Deputies may also be used at section and branch levels of the ICS organization. Deputies must have the same qualifications, as the person they work for, so they are ready to take over that position at any time if necessary.

### ***Responsibilities***

- a. Review Common Responsibilities (page 10).
- b. Assess the situation and/or obtain a briefing from the prior Incident Commander.
- c. Determine incident objectives and strategy.
- d. Establish the immediate priorities.
- e. Establish an Incident Command Post.
- f. Consider the need for Unified Command.
- g. Ensure planning meetings are scheduled as required.
- h. Approve and authorize the implementation of an Incident Action Plan.
- i. Ensure adequate safety measures are in place.
- j. Coordinate activity for all Command and General Staff.
- k. Coordinate with key people and officials.
- l. Approve requests for additional resources or for the release of resources.
- m. Keep agency administrator informed of incident status.
- n. Approve the use of trainees, volunteers, and auxiliary personnel.
- o. Authorize release of information to the news media.
- p. Ensure Incident Status Summary (ICS Form 209) is completed and forwarded to appropriate higher authority.
- q. Order the demobilization of the incident when appropriate.

## ► Information Officer

(ICS 220-2) The Information Officer is responsible for developing and releasing information about the incident to the news media, to incident personnel, and to other appropriate agencies and organizations.

Only one Information Officer will be assigned for each incident, including incidents operating under Unified Command and multi-jurisdiction incidents. The Information Officer may have Assistant Information Officers as necessary, and the Assistant Information Officers may also represent assisting agencies or jurisdictions.

Agencies have different policies and procedures relative to the handling of public information. The following are the major responsibilities of the

Information Officer, which would generally apply on any incident:

### ***Responsibilities***

- a. Review Common Responsibilities (page 10).
- b. Determine from the Incident Commander if there are any limits on information release.
- c. Develop material for use in media briefings.
- d. Obtain Incident Commander's approval of media releases.
- e. Inform media and conduct media briefings.
- f. Arrange for tours and other interviews of briefings that may be required.
- g. Obtain media information that may be useful to incident planning.
- h. Maintain current information summaries and/or displays on the incident and provide information on status of incident to assigned personnel.
- i. Assign Assistant Information Officers as appropriate.
- j. Maintain Unit/Activity Log (ICS Form 214).

### **► Liaison Officer**

(ICS 220-3) Incidents that are multi-jurisdictional, or have several agencies involved, may require the establishment of the Liaison Officer position on the Command Staff.

Only one Liaison Officer will be assigned for each incident, including incidents operating under Unified Command and multi-jurisdictional incidents. The Liaison Officer may have assistants as necessary, and the assistants may also represent assisting agencies or jurisdictions. The Liaison Officer is the point of contact for the Agency Representatives assigned to the incident by assisting or cooperating agencies.

### ***Responsibilities***

- a. Review Common Responsibilities (page 10).
- b. Be a contact point for Agency Representatives.
- c. Maintain a list of assisting and cooperating agencies and Agency Representatives.
- d. Assist in establishing and coordinating interagency contacts.
- e. Keep agencies supporting the incident aware of incident status.
- f. Monitor incident operations to identify current or potential inter-organizational problems.
- g. Participate in planning meetings, providing current resource status, including limitations and capability of assisting agency resources.
- h. Maintain Unit/Activity Log (ICS Form 214).

### **► Agency Representatives**

(ICS 220-5) In many multi-jurisdiction incidents, an agency or jurisdiction will send a representative to assist in coordination efforts.

An Agency Representative is an individual assigned to an incident from an assisting or cooperating agency who has been delegated authority to make

decisions on matters affecting that agency's participation at the incident. Agency Representatives report to the Liaison Officer, or to the Incident Commander in the absence of a Liaison Officer.

### ***Responsibilities***

- a. Review Common Responsibilities (page 10).
- b. Ensure that all agency resources are properly checked in at the incident.
- c. Obtain briefing from the Liaison Officer or Incident Commander.
- d. Inform assisting or cooperating agency personnel on the incident that the Agency Representative position for their agency has been filled.
- e. Attend briefings and planning meetings as required.
- f. Provide input on the use of agency resources unless resource technical specialists are assigned from the agency.
- g. Cooperate fully with the Incident Commander and the General Staff on agency involvement at the incident.
- h. Ensure the well being of agency personnel assigned to the incident.
- i. Advise the Liaison Officer of any special agency needs or requirements.
- j. Report to home agency dispatch or headquarters on a pre-arranged schedule.
- k. Ensure that all agency personnel and equipment are properly accounted for and released prior to departure.
- l. Ensure that all required agency forms, reports and documents are complete prior to departure.
- m. Have a debriefing session with the Liaison Officer or Incident Commander prior to departure.
- n. Maintain Unit/Activity Log (ICS Form 214).

### **► Safety Officer**

(ICS 220-4) The Safety Officer's function is to develop and recommend measures for assuring personnel safety, and to assess and/or anticipate hazardous and unsafe situations. Having full authority of the Incident Commander, the Safety Officer can exercise emergency authority to stop or prevent unsafe acts.

Only one Safety Officer will be assigned for each incident. The Safety Officer may have Assistant Safety Officers as necessary, and the Assistant Safety Officers may have specific responsibilities such as air operations, urban search and rescue, hazardous materials, or for specific geographic or functional areas of the incident.

### ***Responsibilities***

- a. Review Common Responsibilities (page 10).
- b. Participate in planning meetings.
- c. Identify hazardous situations associated with the incident.
- d. Review the Incident Action Plan for safety implications.
- e. Exercise emergency authority to stop or prevent unsafe acts and communicate such exercise authority to the Incident Command.



- f. Investigate accidents that have occurred within the incident area.
- g. Assign Assistant Safety Officers as needed.
- h. Conduct and prepare an Incident Safety Analysis (ICS Form 215-AG/AW) as appropriate.
- i. Initiate appropriate mitigation measures, i.e., Personnel Accountability, Fireline EMT's, Rapid Intervention Crew/Company, etc.
- j. Develop and communicate an incident safety message as appropriate.
- k. Review and approve the Medical Plan (ICS Form 206).
- l. Review and approve Site Safety and Control Plan (ICS Form 208) as required.
- m. Maintain Unit/Activity Log (ICS Form 214).

### ► Operations Section Chief

(ICS 222-1) The Operations Section Chief, a member of the General Staff, is responsible for the management of all operations directly applicable to the primary mission ensuring the overall safety and welfare of all Section personnel. The Operations Section Chief activates and supervises organization elements in accordance with the Incident Action Plan and directs its execution. The Operations Chief also directs the preparation of unit operational plans, requests or releases resources, makes necessary expedient changes to the Incident Action Plan necessary, and reports such to the Incident Commander. The Deputy Operations Section Chief may be assigned for specific tasks, i.e., planning operations, day/night operations, etc.

#### ***Responsibilities***

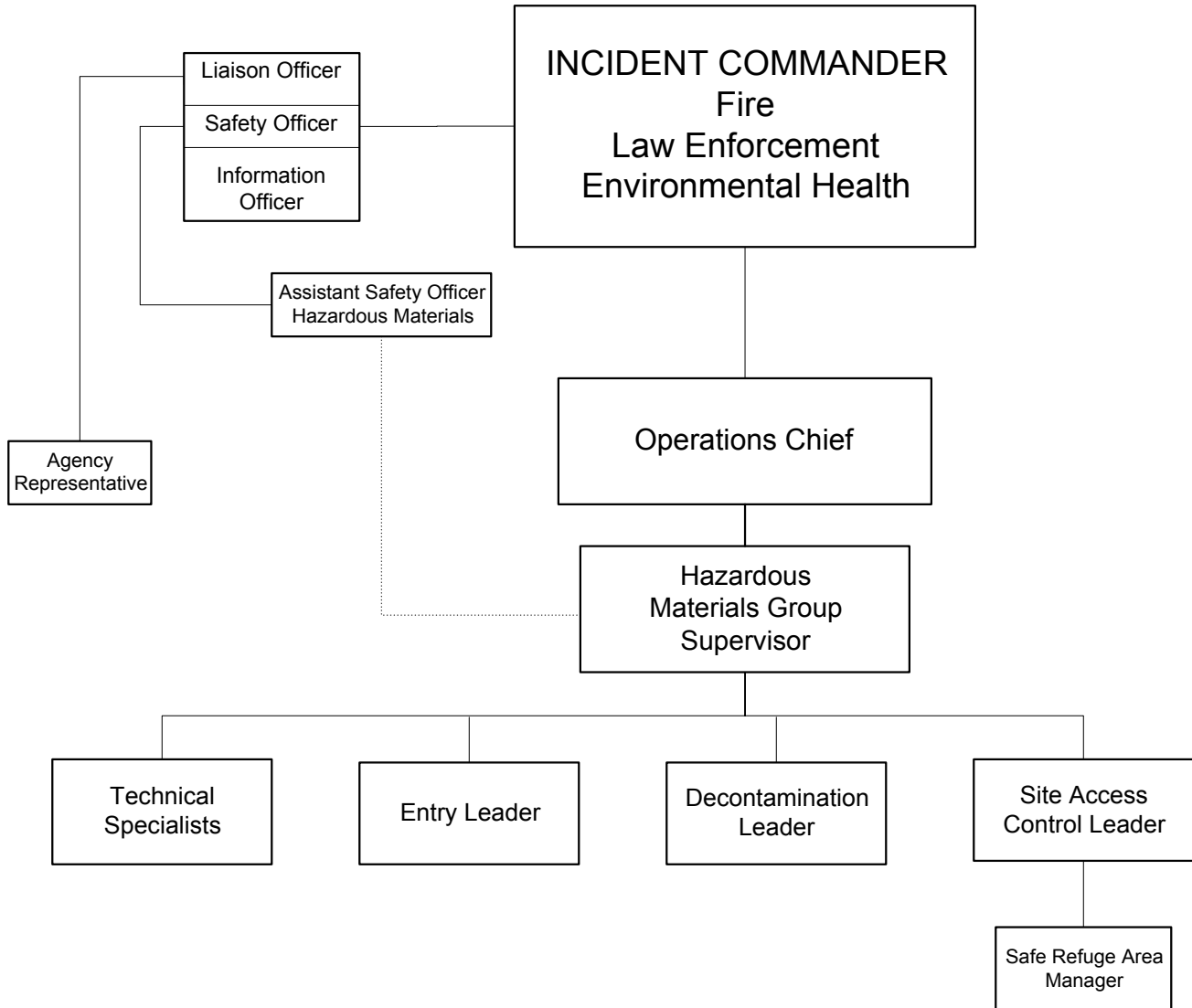
- a. Review Common Responsibilities (page 10).
- b. Develop the operations portion of the Incident Action Plan and complete the appropriate (ICS Form 215 G/W) as appropriate.
- c. Brief and assign Operations Section personnel in accordance with Incident Action Plan.
- d. Supervise Operations Section ensuring safety and welfare of all personnel.
- e. Determine need and request additional resources.
- f. Review suggested list of resources to be released and initiate recommendation for release of resources.
- g. Assemble and disassemble Strike Teams and Task Forces assigned to Operations Section.
- h. Report information about special activities, events, and occurrences to Incident Commander.
- i. Maintain Unit/Activity Log (ICS Form 214).

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**HazMat Operations  
ICS Structure**

The following chart depicts the HazMat Operations ICS structure as described in FIRESCOPE's FIRE SERVICE FIELD OPERATIONS GUIDE, ICS 420-1, INCIDENT COMMAND SYSTEM PUBLICATION.

# HAZ MAT UNIFIED COMMAND



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**Description of HazMat Positions**

The HazMat positions are listed below with their responsibilities, as described in the FIRESCOPE's FIRE SERVICE FIELD OPERATIONS GUIDE, ICS 420-1, INCIDENT COMMAND SYSTEM PUBLICATION.

**Positions****► Unit Leader Responsibilities**

In ICS, a number of the Unit Leader's responsibilities are common to all units in all parts of the organization. Common responsibilities of Unit Leaders are listed below.

***Responsibilities***

- a. Participate in incident planning meetings, as required.
- b. Determine current status of unit activities.
- c. Confirm dispatch and estimated time of arrival of staff and supplies.
- d. Assign specific duties to staff and supervise staff.
- e. Develop and implement accountability, safety and security measures for personnel and resources.
- f. Supervise demobilization of unit, including storage of supplies.
- g. Provide Supply Unit Leader with a list of supplies to be replenished.
- h. Maintain unit records, including Unit/Activity Log (ICS Form 214).

**► Hazardous Materials Group Supervisor**

(ICS-HM-222-1) The Hazardous Materials Group Supervisor or Hazardous Materials Branch Director reports to the Operations Section Chief. The Hazardous Materials Group Supervisor is responsible for the implementation of the phases of the Incident Action Plan dealing with the Hazardous Materials Group operations. The Hazardous Materials Group Supervisor is responsible for the assignment of resources within the Hazardous Materials Group, reporting on the progress of control operations and the status of resources within the Group. The Hazardous Materials Group Supervisor directs the overall operations of the Hazardous Materials Group.

***Responsibilities***

- a. Review Common Responsibilities (page 10).
- b. Ensure the development of Control Zones and Access Control Points and the placement of appropriate control lines.
- c. Evaluate and recommend public protection action options to the Operations Chief or Branch Chief (if activated).
- d. Ensure that current weather data and future weather predictions are obtained.
- e. Establish environmental monitoring of the hazard site for contaminants.
- f. Ensure that a Site Safety and Control Plan (ICS Form 208) is developed and implemented.
- g. Conduct safety meetings with the Hazardous Materials Group.
- h. Participate, when requested, in the development of the Incident Action Plan.
- i. Ensure that recommended safe operational procedures are followed.

- j. Ensure that the proper Personal Protective Equipment is selected and used.
- k. Ensure that the appropriate agencies are notified through the Incident Commander.
- l. Maintain Unit/Activity Log (ICS Form 214).

### ► **Entry Leader**

(ICS-HM-222-2) Reports to the Hazardous Materials Group Supervisor. The Entry Leader is responsible for the overall entry operations of assigned personnel within the Exclusion Zone.

#### ***Responsibilities***

- a. Review Common Responsibilities (page 10).
- b. Supervise entry operations.
- c. Recommend actions to mitigate the situation within the Exclusion Zone.
- d. Carry out actions, as directed by the Hazardous Materials Group Supervisor, to mitigate the hazardous materials release or threatened release.
- e. Maintain communications and coordinate operations with the Decontamination Leader.
- f. Maintain communications and coordinate operations with the Site Access Control Leader and the Safe Refuge Area Manager (if activated).
- g. Maintain communications and coordinate operations with Technical Specialist-Hazardous Materials Reference.
- h. Maintain control of the movement of people and equipment within the Exclusion Zone, including contaminated victims.
- i. Direct rescue operations, as needed, in the Exclusion Zone.
- j. Maintain Unit/Activity Log (ICS Form 214).

### ► **Decontamination Leader**

(ICS-HM-222-3) Reports to the Hazardous Materials Group Supervisor. The Decontamination Leader is responsible for the operations of the decontamination element, providing decontamination as required by the Incident Action Plan.

#### ***Responsibilities***

- a. Review Common Responsibilities (page 10).
- b. Establish the Contamination Reduction Corridor(s).
- c. Identify contaminated people and equipment.
- d. Supervise the operations of the decontamination element in the process of decontaminating people and equipment.
- e. Control the movement of people and equipment within the Contamination Reduction Zone.
- f. Maintain communications and coordinate operations with the Entry Leader.

- g. Maintain communications and coordinate operations with the Site Access Control Leader and the Safe Refuge Area Manager (if activated).
- h. Coordinate the transfer of contaminated patients requiring medical attention (after decontamination) to the Medical Group.
- i. Coordinate handling, storage, and transfer of contaminants within the Contamination Reduction Zone.
- j. Maintain Unit/Activity Log (ICS Form 214).

### ► **Site Access Control Leader**

(ICS-HM-222-4) Reports to the Hazardous Materials Group Supervisor. The Site Access Control Leader is responsible for the control of the movement of all people and equipment through appropriate access routes at the hazard site and ensures that contaminants are controlled and records are maintained.

#### ***Responsibilities***

- a. Review Common Responsibilities (page 10).
- b. Organize and supervise assigned personnel to control access to the hazard site.
- c. Oversee the placement of the Exclusion Control Line and the Contamination Control Line.
- d. Ensure that appropriate action is taken to prevent the spread of contamination.
- e. Establish the Safe Refuge Area within the Contamination Reduction Zone. Appoint a Safe Refuge Area Manager (as needed).
- f. Ensure that injured or exposed individuals are decontaminated prior to departure from the hazard site.
- g. Track the movement of persons passing through the Contamination Control Line to ensure that long-term observations are provided.
- h. Coordinate with the Medical Group for proper separation and tracking of potentially contaminated individuals needing medical attention.
- i. Maintain observations of any changes in climatic conditions or other circumstances external to the hazard site.
- j. Maintain communications and coordinate operations with the Entry Leader.
- k. Maintain communications and coordinate operations with the Decontamination Leader.
- l. Maintain Unit/Activity Log (ICS Form 214).

### ► **Assistant Safety Officer (Hazardous Materials)**

(ICS-HM-222-5) Reports to the Incident Safety Officer as an Assistant Safety Officer and coordinates with the Hazardous Materials Group Supervisor or Hazardous Materials Branch Director if activated. The Assistant Safety Officer-Hazardous Materials coordinates safety related activities directly relating to the Hazardous Materials Group operations as mandated by 29 CFR part 1910.120 and applicable state and local laws. This position advises the Hazardous Materials Group Supervisor (or Hazardous Materials Branch Director) on all aspects of health and safety and has the authority to stop or

prevent unsafe acts. It is mandatory that an Assistant Safety Officer-Hazardous Materials be appointed at all hazardous materials incidents. In a multi-activity incident, the Assistant Safety Officer-Hazardous Materials does not act as the Safety Officer for the overall incident.

### ***Responsibilities***

- a. Review Common Responsibilities (page 10).
- b. Obtain briefing from the Hazardous Materials Group Supervisor.
- c. Participate in the preparation of, and implement the Site Safety and Control Plan (ICS Form 208).
- d. Advise the Hazardous Materials Group Supervisor (or Hazardous Materials Branch Director) of deviations from the Site Safety and Control Plan (ICS Form 208) or any dangerous situations.
- e. Has authority to alter, suspend, or terminate any activity that may be judged to be unsafe.
- f. Ensure the protection of the Hazardous Materials Group personnel from physical, environmental, and chemical hazards/exposures.
- g. Ensure the provision of required emergency medical services or assigned personnel and coordinate with the Medical Unit Leader.
- h. Ensure that medical related records for the Hazardous Materials Group personnel are maintained.
- i. Maintain Unit/Activity Log (ICS Form 214).

### **► Technical Specialist (Hazardous Materials Reference)**

(ICS-HM-222-6) Reports to the Hazardous Materials Group Supervisor. This position provides technical information and assistance to the Hazardous Materials Group using various reference sources such as computer databases, technical journals, CHEMTREC, and phone contact with facility representatives. The Technical Specialist-Hazardous Materials Reference may provide product identification using hazardous categorization tests and/or any other means of identifying unknown materials.

### ***Responsibilities***

- a. Review Common Responsibilities (page 10).
- b. Obtain briefing from the Planning Section Chief or assigned supervisor.
- c. Provide technical support to the Hazardous Materials Group Supervisor.
- d. Maintain communications and coordinate operations with the Entry Leader.
- e. Provide and interpret environmental monitoring information.
- f. Provide analysis of hazardous material sample.
- g. Determine personal protective equipment compatibility to hazardous material.
- h. Provide technical information of the incident for documentation.
- i. Provide technical information management with public and private agencies i.e., Poison Control Center, Toxicology Center, CHEMTREC, State Department of Food and Agriculture, National Response Team.
- j. Assist Planning Section with projecting the potential environmental effects of the release.

- k. Maintain Unit/Activity Log (ICS Form 214).

### ► Safe Refuge Area Manager

(ICS-HM-222-7) The Safe Refuge Area Manager reports to the Site Access Control Leader and coordinates with the Decontamination Leader and the Entry Leader. The Safe Refuge Area Manager is responsible for evaluating and prioritizing victims for treatment, collecting information from the victims, and preventing the spread of contamination by these victims. If there is a need for the Safe Refuge Area Manager to enter the Contamination Reduction Zone in order to fulfill assigned responsibilities, then the appropriate Personal Protective Equipment shall be worn.

#### ***Responsibilities***

- a. Review Common Responsibilities (page 10).
- b. Establish the Safe Refuge Area within the Contamination Reduction Zone adjacent to the Contamination Reduction Corridor and the Exclusion Control Line.
- c. Monitor the hazardous materials release to ensure that the Safe Refuge Area is not subject to exposure.
- d. Assist the Site Access Control Leader by ensuring the victims are evaluated for contamination.
- e. Manage the Safe Refuge Area for the holding and evaluation of victims who may have information about the incident, or if suspected of having contamination.
- f. Maintain communications with the Entry Leader to coordinate the movement of victims from the Refuge Area(s) in the Exclusion Zone to the Safe Refuge Area.
- g. Maintain communications with the Decontamination Leader to coordinate the movement of victims from the Safe Refuge Area into the Contamination Reduction Corridor, if needed.
- h. Maintain Unit/Activity Log (ICS Form 214).

**ASSISTING AGENCIES** An agency contributing resources to another agency.

### ► Law Enforcement

Local, State, and Federal law enforcement agencies may respond to Hazardous Materials incidents. Depending on incident factors, law enforcement may be a partner in Unified Command or may participate as an assisting agency. Some functional responsibilities that may be handled by law enforcement are:

#### ***Responsibilities***

- a. Isolates the incident area.
- b. Manages crowd control.
- c. Manages traffic control.
- d. Manages public protective action.
- e. Provides scene management for on-highway incidents.
- f. Manage criminal investigations.



- g. Evidence collection.

### ► Environmental Health Agencies

In most cases the local or State environmental health agency will be at the scene as a partner in Unified Command. Some functional responsibilities that may be handled by environmental health agencies are:

#### ***Responsibilities***

- a. Determine the identity and nature of the Hazardous Materials.
- b. Establish the criteria for clean up and disposal of the Hazardous Materials.
- c. Declare the site safe for re-entry by the public.
- d. Provide the medical history of exposed individuals.
- e. Monitor the environment.
- f. Supervise the clean up of the site.
- g. Enforces various laws and acts.
- h. Determine legal responsibility.
- i. Provide technical advice.
- j. Approve funding for the clean up.

### ► Civil Support Team (CST)

The California National Guard (CNG) Weapons of Mass Destruction Civil Support Teams (CST) are designed to support local incident commanders and local emergency first responders 24 hours a day, seven days per week for any Weapons of Mass Destruction (WMD) terrorist event.

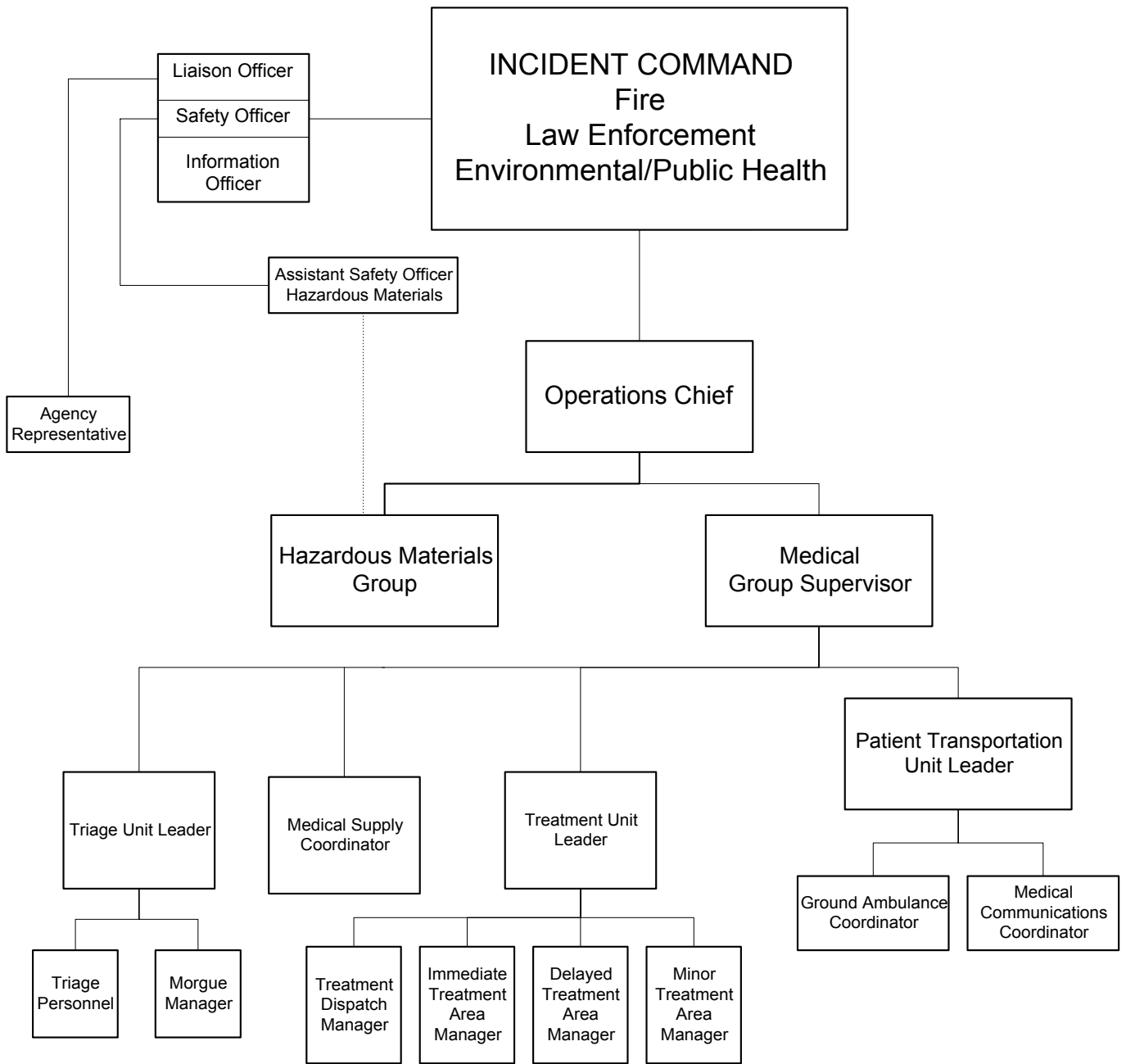
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### **Haz Mat/Multi-Casualty Operations ICS Structure**

The following chart depicts the Haz Mat/Multi-Casualty Operations ICS structure, as described in the FIREScope's FIRE SERVICE FIELD OPERATIONS GUIDE, ICS 420-1, INCIDENT COMMAND SYSTEM PUBLICATION.

Of the many types of emergency situations encountered, few are as potentially complex as that of a hazardous materials incident, which results in multi-casualties. To respond and mitigate such an emergency, a variety of agencies and medical teams are brought together to effectively coordinate their efforts. All these groups have different interests, responsibilities, and authorities, yet all have the common goal of saving lives. In order to provide a coordinated response, all these groups are integrated into a common organizational structure designed to improve the response operations.

# HAZ MAT/MULTI-CASUALTY UNIFIED COMMAND



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## Description of Haz Mat/Multi-Casualty Positions

The Haz Mat/Multi-Casualty positions are listed below with their responsibilities, as described in the FIRESCOPE's FIRE SERVICE FIELD OPERATIONS GUIDE, ICS 420-1, INCIDENT COMMAND SYSTEM PUBLICATION.

### Positions

#### ► Medical Branch Director

(ICS-MC-222-1) The Medical Branch Director is responsible for the implementation of the Incident Action Plan within the Medical Branch. The Branch Director reports to the Operations Section Chief and supervises the Medical Group(s) and the Patient Transportation function (Unit or Group) based on the size and complexity of the incident.

#### **Responsibilities**

- a. Review Common Responsibilities (page 10).
- b. Review Group Assignments for effectiveness of current operations and modify as needed.
- c. Provide input to Operations Section Chief for the Incident Action Plan.
- d. Supervise Branch activities.
- e. Report to Operations Section Chief on Branch activities.
- f. Maintain Unit/Activity Log (ICS Form 214).

#### ► Medical Group/Division Supervisor

(ICS-MC-222-3) The Medical Group/Division Supervisor reports to the Medical Branch Director and supervises the Triage Unit Leader, Treatment Unit Leader, Patient Transportation Unit Leader and Medical Supply Coordinator. The Medical Group/Division Supervisor establishes command and controls the activities within a Medical Group/Division.

#### **Responsibilities**

- a. Review Common Responsibilities (page 10).
- b. Participate in Multi-Casualty Branch/Operations Section planning activities.
- c. Establish Medical Group/Division with assigned personnel, request additional personnel and resources sufficient to handle the magnitude of the incident.
- d. Designate Unit Leaders and Treatment Area locations as appropriate.
- e. Isolate Morgue and Minor Treatment Area from Immediate and Delayed Treatment Areas.
- f. Request law enforcement/coroner involvement as needed.
- g. Determine amount and types of additional medical resources and supplies needed to handle the magnitude of the incident (medical caches, backboards, litters, cots).
- h. Ensure activation or notification of hospital alert system, local EMS/health agencies.
- i. Direct and/or supervise on-scene personnel from agencies such as Coroner's Office, Red Cross, law enforcement, ambulance companies, county health agencies, and hospital volunteers.

- j. Request proper security, traffic control, and access for the Medical Group work areas.
- k. Direct medically trained personnel to the appropriate Unit Leader.
- l. Maintain Unit/Activity Log (ICS Form 214).

### ► Triage Unit Leader

(ICS-MC-222-5) The Triage Unit Leader reports to the Medical Group/Division Supervisor and supervises Triage Personnel/Litter Bearers and the Morgue Manager. The Triage Unit Leader assumes responsibility for providing triage management and movement of patients from the triage area. When triage has been completed, the Unit Leader may be reassigned as needed.

#### ***Responsibilities***

- a. Review Common Responsibilities (page 10).
- b. Review Unit Leader Responsibilities (page 17).
- c. Develop organization sufficient to handle assignment.
- d. Inform Medical Group Supervisor of resource needs.
- e. Implement triage process.
- f. Coordinate movement of patients from the Triage Area to the appropriate Treatment Area.
- g. Give periodic status reports to Medical Group Supervisor.
- h. Maintain security and control of the Triage Area.
- i. Establish Morgue.
- j. Maintain Unit/Activity Log (ICS Form 214).

### ► Triage Personnel

Triage Personnel report to the Triage Unit Leader and triage patients and assign them to appropriate treatment areas.

#### ***Responsibilities***

- a. Review Common Responsibilities (page 10).
- b. Report to designated on-scene triage location.
- c. Triage and tag injured patients. Classify patients while noting injuries and vital signs if taken.
- d. Direct movement of patients to proper Treatment areas.
- e. Provide appropriate medical treatment to patients prior to movement as incident conditions dictate.

## ► Morgue Manager

### ***Responsibilities***

The Morgue Manager reports to the Triage Unit Leader and assumes responsibility for Morgue Area activities until properly relieved.

- a. Review Common Responsibilities (page 10).
- b. Assess resource/supply needs and order as needed.
- c. Coordinate all Morgue Area activities.
- d. Keep area off limits to all but authorized personnel.
- e. Coordinate with law enforcement and assist the Coroner or Medical Examiner representative.
- f. Keep identity of deceased persons confidential.
- g. Maintain appropriate records.

## ► Medical Supply Coordinator

(ICS-MC-222-6) The Medical Supply Coordinator reports to the Medical Group Supervisor and acquires and maintains control of appropriate medical equipment and supplies from units assigned to the Medical Group.

### ***Responsibilities***

- a. Review Common Responsibilities (page 10).
- b. Acquire, distribute, and maintain status of medical equipment and supplies within the Medical Group. If the Logistics Section is established, this position would coordinate with the Logistics Section Chief or Supply Unit Leader.
- c. Request additional medical supplies. If the Logistics Section is established, this position would coordinate with the Logistics Section or Supply Unit Leader.
- d. Distribute medical supplies to Treatment and Triage Units.
- e. Maintain Unit/Activity Log (ICS-214).

## ► Treatment Unit Leader

(ICS-MC-222-4) The Treatment Unit Leader reports to the Medical Group Supervisor and supervises the Treatment Managers and the Treatment Dispatch Manager. The Treatment Unit Leader assumes responsibility for treatment, preparation for transport, and directs movement of patients to loading location(s).

### ***Responsibilities***

- a. Review Common Responsibilities (page 10).
- b. Review Unit Leader Responsibilities (page 17).
- c. Develop organization sufficient to handle assignment.
- d. Direct and supervise Treatment Dispatch, Immediate, Delayed, and Minor Treatment Areas.
- e. Coordinate movement of patients from Triage Area to Treatment

- Areas with Triage Unit Leader.
- f. Request sufficient medical caches and supplies as necessary.
  - g. Establish communications and coordination with Patient Transportation Group.
  - h. Ensure continual triage of patients throughout Treatment Areas.
  - i. Direct movement of patients to ambulance loading area(s).
  - j. Give periodic status reports to Medical Group Supervisor.
  - k. Maintain Unit/Activity Log (ICS Form 214).

### ► Treatment Dispatch Manager

The Treatment Dispatch Manager reports to the Treatment Unit Leader and is responsible for coordinating with Patient Transportation Unit Leader (or Group Supervisor if established), the transportation of patients out of the Treatment Areas.

#### ***Responsibilities***

- a. Review Common Responsibilities (page 10).
- b. Establish communications with the Immediate, Delayed, and Minor Treatment Managers.
- c. Establish communications with Patient Transportation Unit Leader.
- d. Verify that patients are prioritized for transportation.
- e. Advise Medical Communications Coordinator of patient readiness and priority for transport.
- f. Coordinate transportation of patients with Medical Communications Coordinator.
- g. Assure that appropriate patient tracking information is recorded.
- h. Coordinate ambulance loading with Treatment Manager and ambulance personnel.
- i. Maintain Unit/Activity Log (ICS Form 214).

### ► Immediate Treatment Area Manager

The Immediate Treatment Area Manager reports to the Treatment Unit Leader and is responsible for treatment and re-triage of patients assigned to Immediate Treatment Area.

#### ***Responsibilities***

- a. Review Common Responsibilities (page 10).
- b. Request or establish Medical Teams as necessary.
- c. Assign treatment personnel to patients received in the Immediate Treatment Area.
- d. Ensure treatment of patients triaged to the Immediate Treatment Area.
- e. Assure that patients are prioritized for transportation.
- f. Coordinate transportation of patients with Treatment Dispatch Manager.
- g. Notify Treatment Dispatch Manager of patient readiness and priority for transportation.
- h. Assure that appropriate patient information is recorded.

- i. Maintain Unit/Activity Log (ICS Form 214).

### ► **Delayed Treatment Area Manager**

The Delayed Treatment Area Manager reports to the Treatment Unit Leader and is responsible for treatment and re-triage of patients assigned to Delayed Treatment Area.

#### ***Responsibilities***

- a. Review Common Responsibilities (page 10).
- b. Request or establish Medical Teams as necessary.
- c. Assign treatment personnel to patients received in the Delayed Treatment Area.
- d. Ensure treatment of patients triaged to the Delayed Treatment Area.
- e. Assure that patients are prioritized for transportation.
- f. Coordinate transportation of patients with Treatment Dispatch Manager.
- g. Notify Treatment Dispatch Manager of patient readiness and priority for transportation.
- h. Assure that appropriate patient information is recorded.
- i. Maintain Unit/Activity Log (ICS Form 214).

### ► **Minor Treatment Area Manager**

The Minor Treatment Area Manager reports to the Treatment Unit Leader and is responsible for treatment and re-triage of patients assigned to Minor Treatment Area.

#### ***Responsibilities***

- a. Review Common Responsibilities (page 10).
- b. Request or establish Medical Teams as necessary.
- c. Assign treatment personnel to patients received in the Minor Treatment Area.
- d. Ensure treatment of patients triaged to the Minor Treatment Area.
- e. Assure that patients are prioritized for transportation.
- f. Coordinate transportation of patients with Treatment Dispatch Manager.
- g. Notify Treatment Dispatch Manager of patient readiness and priority for transportation.
- h. Assure that appropriate patient information is recorded.
- i. Maintain Unit/Activity Log (ICS Form 214).

### ► **Patient Transportation Unit Leader or Group Supervisor**

(ICS-MC-222-2) The Patient Transportation Unit Leader reports to the Medical Group Supervisor and supervises the Medical Communications Coordinator and the Ambulance Coordinator. The Patient Transportation Unit Leader is responsible for the coordination of patient transportation and

maintenance of records relating to patient's identification, condition, and destination. The Patient Transportation function may be initially established as a Unit and upgraded to a Group based on incident size or complexity.

### ***Responsibilities***

- a. Review Common Responsibilities (page 10).
- b. Insure the establishment of communications with hospital(s).
- c. Designate Ambulance Staging Area(s).
- d. Direct the off-incident transportation of patients as determined by the Medical Communications Coordinator.
- e. Assure that patient information and destination is recorded.
- f. Establish communications with Ambulance Coordinator(s).
- g. Request additional ambulances as required.
- h. Notify Ambulance Coordinator of ambulance requests.
- i. Coordinate requests for air ambulance transportation through the Air Operations Branch Director.
- j. Coordinate the establishment of the Air Ambulance Helispots with the Medical Branch Director and Air Operations Branch Director.
- k. Maintain Unit/Activity Log (ICS-214).

### **► Ground Ambulance Coordinators**

(ICS-MC-222-8) The Ground Ambulance Coordinator reports to the Patient Transportation Unit Leader, manages the Ambulance Staging Area(s) and dispatches ambulances as requested.

### ***Responsibilities***

- a. Review Common Responsibilities (page 10).
- b. Establish appropriate staging area for ambulances.
- c. Establish routes of travel for ambulances for incident operations.
- d. Establish and maintain communications with the Air Operations Branch Director regarding Air Ambulance Transportation assignments.
- e. Establish and maintain communications with the Medical Communications Coordinator and Treatment Dispatch Manager.
- f. Provide ambulances upon request from the Medical Communications Coordinator.
- g. Assure that necessary equipment is available in the ambulance for patient needs during transportation.
- h. Establish contact with ambulance providers at the scene.
- i. Request additional transportation resources as appropriate.
- j. Provide an inventory of medical supplies available at ambulance staging area for use at the scene.
- k. Maintain records as required (ICS Form 214).



## ► Medical Communications Coordinator

(ICS-MC-222-7) The Medical Communications Coordinator reports to the Patient Transportation Unit Leader, and maintains communications with the hospital alert system to maintain status of available hospital beds to assure proper patient transportation. The Medical Communication Coordinator assures proper patient transportation and destination.

### ***Responsibilities***

- a. Review Common Responsibilities (page 10).
- b. Establish communications with the hospital alert system.
- c. Determine and maintain current status of hospital/medical facility availability and capability.
- d. Receive basic patient information and condition from Treatment Dispatch Manager.
- e. Coordinate patient destination with the hospital alert system.
- f. Communicate patient transportation needs to Ambulance Coordinators based upon requests from Treatment Dispatch Manager.
- g. Communicate patient air ambulance transportation needs to the Air Operations Branch Director based on requests from the treatment area managers or Treatment Dispatch Manager.
- h. Maintain appropriate records.

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### **References**

1. FIREScope, Fire Service Field Operations Guide ICS 420-1 Incident Command System Publication.
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# CHAPTER THREE

## HUMANITARIAN EFFORTS

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### Introduction

Many hours are spent training emergency response HazMat Teams on the decontamination methods and procedures for removing contaminants from team members. HazMat Teams also receive training on the decontamination of civilians, however, this training is often limited to small number of victims. Some emergency response agencies, most notably in the fire/rescue community, have provided their First Responders with some remedial civilian decontamination procedures. With the advent and introduction of the Mass Decontamination concept, both First Responders and HazMat Teams are challenged with the need to review their current decontamination capabilities. A new focus must be directed to upgrade and modify their procedures to include a mass decontamination capability. Procedures must take into consideration cultural differences, language barriers, and personal concerns.

This chapter provides information on Cultural Sensitivity, Positive Communication, Protecting the Victims' Modesty, and Handling Personal Items for First Responders and HazMat Teams to glean from for facing their challenge.

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### Cultural Sensitivity

The State of California is very culturally diverse, made up of many ethnic and social groups with many inter-group variations in values, beliefs and practices. In addition, individuals within the same social group have different life experiences that contribute to variations in the degree to which they adhere to the norms commonly attributed to their culture. Also, the individuals from these diverse cultures and varying ethnic and social groups may speak languages other than English as their primary language.

### Resources

The information on the diversity within the communities of the United States of America is available from the Census Bureau by:

- Dialing 1-800-233-3308 (Seattle Regional Office of the U.S. Census Bureau).
- Accessing the website [www.census.gov](http://www.census.gov).

Additional resources to access are education centers, local colleges, English as a second language (ESL) programs, churches, and community groups.

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### Positive Communication

How First Responders communicate to the victims, as they rescue, decontaminate, and medically treat them, can aid or delay the appropriate response. To lessen the victims' fears about the emergency process and ensure their cooperation throughout all the phases of the response, First Responders need to communicate pertinent information that is simple and understandable.

## **Benefits**

The benefits of good communication include:

- Improve victims' understanding and acceptance of the HazMat emergency response and the associated health and safety risks;
- Improve First Responder understanding of the victims' concerns regarding a HazMat emergency response;
- Improve ability for the victims to act on First Responder requests (e.g., decontamination procedures, shelter-in-place, evacuation); and
- Decrease potential for legal action by the victims.

## **Key Elements**

When communicating to victims, key elements to consider are:

- A. Objectives when Communicating to Victims.
- B. Effective Mechanisms for Communication.
- C. Communication Factors and Actions to Build Trust and Credibility.
- D. Victims' Concerns.
- E. Respected Public Communicators.

## **Objectives**

### **A. Objectives when Communicating to Victims:**

Emergency service agencies need communication objectives as a guide to improve on and off-scene communication with civilians and victims. Communication objectives provide an excellent platform to insure that application of other procedures are more effective, incident handling is better focused, and desired outcomes are likely to be achieved. The following tables are suggested communication objectives for Pre, During, and Post incidents.

Pre-Incident Objective	Action
Educate	<p>Educate the community on what your emergency service agency developed and designed for responding to hazardous materials incidents in general, and decontamination issue specifics.</p> <p>The community deserves to be kept informed about the response capabilities that may affect them directly. Educating the community will allow the local emergency response service agencies to demonstrate that they are progressive and responsive to changing and demanding times. The positive trade-off to familiarizing the community on the response capabilities is that an informed community will be a more cooperative community during a time of local crisis.</p>
Train First Responders	<p>Train all First Responders on inter-active communication skills with civilians, in order to improve how they explain situations in non-technical terms that the community-at-large can understand.</p> <p>First Responders need be ready to apply their communication skills in such a manner to efficiently convey important information. To gain their community's attention, confidence, and cooperation they need to be appreciative and sensitive to the wide diversity (ethnicity, values, beliefs, practices, and languages).</p>
Determine Victims' Concerns	<p>Allow victims to express their concerns about the response to hazardous material incidents.</p> <p>Victims will have why, what, where, when, and how questions about the First Responders procedures and actions to be taken during a hazardous material incident. They will be expecting answers to these questions, and if not addressed they could become intolerant to responding to the life-saving requests of First Responders. To avoid potential resistance from victims, First Responders need to address their concerns.</p>

During Incident Objective	Action
Address Victims' Specific Concerns	<p>Address victims' specific concerns in a calm and reassuring manner.</p> <p>During an incident, victims will have fears and questions about the response. Fear is a natural response. And, in such situations victims desperately need answers. Responding to both by using non-threatening and respectful language will help alleviate these fears and address their concerns.</p> <p>Keep in mind, when victims express their specific concerns, they, too, can provide valuable information to assist emergency responders in identifying the source of exposure such as chemical clouds, nearby pesticide or other chemical use or storage sites.</p>
Communicate Vital and Pertinent Information	<p>Convey vital and pertinent information to victims and civilians in a manner that contributes to improving incident efficiency and success.</p> <p>Victims will need to know how to clean and protect themselves, what medical aid may be necessary, and where they can receive medical aid. The First Responder must provide all of this information and more, quickly, efficiently, and correctly.</p>
Post-Incident Objective	Action
Provide Follow Up Information	<p>Have a mechanism in place for victims and civilians to access general information that corrects misconceptions and alleviates general anxiety.</p>

**Effective Mechanisms      B. Effective Mechanisms for Communication**

Below are several vehicles for communication between the First Responder, victims, and the community to utilize before, during, and/or after an incident:

- Posters/cards/flyers.
- Video.
- Brochures.
- Community Group Meetings.
- Public forums.
- Mass media.

**Posters/Cards/Flyers**

Posters/cards/flyers are cost effective and appropriate for short-term, single message communication efforts that cover one subject, e.g. decontamination,

and are most useful during an incident. Some general guidelines to follow when utilizing this type of communication are:

- Focus on one subject;
- Design to be picked up, carried away, and read quickly;
- Employ verbal, visual, and Braille communication. Sometimes pictures tell a thousand words. And, remember some people receiving the information may be blind, deaf or illiterate;
- Produce in the different languages spoken in your community; and
- Distribute where necessary.

On the following page is an example of what First Responders may hand out or post for contaminated victims to lessen their fears of decontamination and address their common concerns.

(AGENCY)  
(Agency Address)

\*\*\*INFORMATION BULLETIN\*\*\*

## What is Decontamination?

This bulletin provides valuable information about a process called “Decontamination” that our agency may exercise during this incident. This bulletin will help explain to you the concept of field decontamination, and the reasons why to institute it.

As a result of this incident, you may have come into contact with a hazardous material. A member of the (-inset agency name-) will evaluate your condition and determine your status concerning possible contamination.

If you are selected for decontamination please read the following: **The decontamination process is intended to remove or reduce the contamination from individuals by physical or chemical means to prevent possible further contamination or exposure to the hazardous material. Decontamination is a fancy word to describe nothing more than a cleansing process that is set up quickly anywhere. It may vary in degrees from simple hands and face washing, to a whole body wash and rinse. The degree of the decontamination is determined by the (-inset agency name-) based upon the perceived threat. A typical decontamination process consists of the following:**

1. Evaluation – Determines the threat, contamination potential, and need for decontamination.
2. Method – The degree of decontamination is determined.
3. Clothing removal – For the purpose of removing contaminants physically.
4. Wash – Water is an excellent solution to physically remove contaminants from the body.
5. Soap – Mild soap might be provided as a surfactant to lock onto the contaminant.
6. Rinse – Removes all soap, debris and contaminant.
7. Garment – A disposal type of garment is issued for donning.
8. Re-evaluation – Determines if you can be released, or should seek medical checkup.

If you experience any medical problems please inform a member of the (-inset agency name-). Give them a complete explanation of your symptoms. Following the incident, contact your physician or health care provider immediately and provide them a complete explanation of the circumstances.

For additional information, please contact your local County Health Department (phone number).

On the opposite side of the handout, First Responders could place universal pictures to depict:

- The removal of contaminants from a person or personal effects;
- The four major parts of the decontamination process (evaluation, removal of contaminated clothing, wash and rinse, and donning of clean garments and re-evaluation); and/or
- The handling of the victims' modesty.

**Remember, the handouts, more than likely, will become contaminated as the victims handle them. Containing the handouts to a specific area (like at the decontamination entrance) is extremely important to prevent secondary contamination.**

### Video

An alternative to posters/cards/flyers is a short repeating video. At the entrance of the decontamination corridor, contaminated victims could watch an instructional video on how to decontaminate themselves as they proceed forward.

### Brochures

Brochures are useful before or after an incident to communicate with the public. These avenues of communications take advantage of the mailing database of the agencies' utilities billing department. The agency designs and publishes the brochure in the required amount, and asks that the next cycle of a utility billing include an insert.

Brochures can contain information on the adoption of new programs that complement and expand that agencies' response capability in various areas, such as hazardous materials and terrorism. The intent is to educate the public, and keep them current on these issues of continued preparation. The public is very receptive to this form of communication, and the cost for production and distribution is relatively inexpensive. Brochures can also address the community's perceptions and concerns.

Some general guidelines to follow when instituting a brochure program are:

- Include graphics and pictures, as a "picture is worth a thousand words." Do not over use graphics.
- Avoid using technical words, keep sentences short and simple, and avoid using acronyms and abbreviations;
- Organize information in bullet or outline form for the user to more easily scan; and



- Produce an eye-catching, high quality product.

To address a multilingual region of a community, the reverse side of the pamphlet or brochure can be replicated in a second language.

### **Community Group Meetings**

Community group meetings are a very effective communication mechanism to educate the community on what your emergency service agency developed and designed for addressing responses to hazardous material incidents in general, and decontamination issues in specifics. Be prepared to answer some general questions.

### **Public Forums**

Public forums are a way to engage the community in promoting constructive dialogue. Public forums are rare, and are arranged only after an exceptionally complex and controversial issue. Good meticulous planning must go into the design and announcement of a public forum so that the process of the meeting is facilitated in such a way as to avoid posturing and injection of misinformation.

Some general guidelines to follow when planning a public forum are:

- Assemble and utilize members of an organization who are familiar with proper agenda design;
- Select a facility to accommodate the size and comfort of your participants and which is easy to find;
- Use a neutral facilitator or master of ceremonies;
- Identify the goals and purpose for the forum;
- Have in attendance appropriate specialists and experts, and introduce them;
- Keep announcements brief, concise, and accurate;
- Present in a positive demeanor;
- Record points articulated by attendees; and
- Have a mechanism to research and provide responses to unanswered questions and additional issues raised.

### **Mass Media**

Mass media, especially radio and television, is a communication mechanism:

- Prior to an incident:

educate the community on what your emergency service agency developed and designed for addressing responses to hazardous material incidents in general, and decontamination issues specifically.

- During an incident:
  1. Describe the incident and emergency response;
  2. Tell the public how to protect themselves (i.e., shelter-in-place, self decontamination, etc.); describe signs and symptoms to determine if medical treatment is required to warn the public to avoid certain areas, and
  3. Inform victims, who left the incident prior to decontamination, about what to do to prevent secondary contamination to vehicles, family members, or associates, and where to go for medical care; and
  
- After an incident:

Provide to the public and the victims post incident information (i.e., what happened, follow-up medical care, long-term health effects, safe re-entry, legal actions, etc.).

**Remember communities are typically multilingual; so present your message on radio and television stations that cater to all the languages within your community.**

## Communication Factors and Actions

### C. Communication Factors and Actions To Build Trust and Credibility

#### Communication Factors

The success of any communication effort is highly dependent on the history of the relationship between the First Responders and the community. If the history consists of a trusting and interactive relationship, the communication effort has a good foundation for success. On the other hand, if the history consists of confrontation and distrust, the communication effort can be very difficult. Of course, acting trustworthy is no guarantee that people will trust you. But if the agency fails to impart efforts to improve its credibility within the community, resistance in the form of disagreement and resentment often will result.

When communicating to victims, First Responders should emphasize the following factors that inspire trust and credibility:

- Competency/professionalism.
- Care.
- Empathy.
- Compassion.
- Respect.
- Understanding.
- Organization.
- Commitment.
- Knowledge.
- Encouragement of Involvement.
- Honesty.

## Communication Actions

To foster and help maintain trust and credibility, the following key actions need to occur:

<b>Pre-Incident</b>	<b>How Achieved</b>
Establish Communication	Members of agency make direct personal contact with community to foster trust/credibility.
Maintain Communication	Do not forget or dismiss those with whom the agency has established a contact. Establish a routine by which those contacted will receive repeated updates on reliable basis.
Educate	Educate the community on what your emergency service agency developed and designed for responding to hazardous materials incidents in general, and decontamination issues specifically.
Communicate Clearly & Concisely	Speak and convey information in strict lay terms. Avoid getting technical, or too detailed into specific departmental procedures, as this will often lose the listener. Speak clearly, concisely, deliberately, confidently, and be organized in the thought process.
Provide Updates	Provide updates on new or modified emergency programs that may affect them directly.

<b>During Incident</b>	<b>How Achieved</b>
Establish Communication	Members of agency make direct personal contact and introduce self to those in need of information and help. Request to speak to a spokesperson that may represent a larger group, and establish a sustaining contact.
Maintain Communication	Do not forget or dismiss those with whom the agency has established a contact. Establish a routine by which those contacted will receive repeated updates on a reliable basis.
Communicate Vital and Pertinent Information	Victims and civilians will anxiously want to hear reassuring and guiding information. Members of the agency must provide vital and pertinent information regarding the situation, e.g., why are they here, what is going on, how bad is the “stuff,” are we in harms way, what are you doing about it, when can we go back to work, are things contaminated, how do we clean and protect ourselves, what medical aid is necessary, where do we receive medical aid?
Communicate Clearly & Concisely	Speak and convey information in strict lay terms. Avoid getting technical, or too detailed into specific departmental procedures, as this will often lose the listener. Speak clearly, concisely, deliberately, confidently, and be organized in the thought process.
Provide Updates	The agency’s liaison should announce and provide periodic progress reports with regard to what is being done. Progress reports aid substantially in continuing to calm the public.
Respect Privacy	On issues concerning one’s privacy, conduct specific interviews with individuals in a private and separate location. Make arrangements to address privacy issues of any kind.

Post-Incident	How Achieved
Provide Updates	<p data-bbox="829 195 1430 300">Inform the civilians at the scene, and the public via news media reports, of the procedures that will be in place to provide follow up announcements and update information.</p> <p data-bbox="829 331 1442 495">Sometimes peripheral information handling will create demands exceeding that associated directly with an incident. "Hot Lines", "Rumor Control", and other sources utilizing 800 numbers help significantly in disseminating general information, correcting misconceptions, and alleviating general anxiety.</p> <p data-bbox="829 527 1490 690">Sometimes specific "one-on-one" follow up may be anticipated with identified individuals (those contaminated), thereby necessitating the creation of a name and telephone list of victims. There may be reasons for the responding agency, or the medical and health community, to locate and maintain a dialogue with specific individuals long after an incident.</p>
Investigation	<p data-bbox="829 751 1495 915">Insure the victims and others that the incident is under investigation, and that a report will be created. Inform those who wish to know how copies of various reports can be obtained. Explain the investigative system that is in place, and that such investigation is a matter of routine departmental policy.</p>

**Concerns**

**D. Victims' Concerns:**

As a result of a higher level of training and discipline, First Responders often focus on the scientific, technical and procedural issues associated with an emergency response. Victims do not possess the First Responders' knowledge and sense of urgency. Victims and First Responders often view perceptions of hazard, identification of risks to health and safety, and the need to follow instructions differently. To prevent interruptions due to disagreements, arguments and debates, First Responders should quickly communicate to victims the threat to life safety and the need to follow instructions in a positive and reassuring manner. Technical terms and abrupt language should be avoided.

First Responders concentrate on stabilizing the emergency, saving lives, and eliminating hazards. In doing so they may become somewhat desensitized to the victim's concerns. Failure to recognize and address the concerns of the victims can breed fear and anger, which when not addressed, can lead to an expression of outrage toward First Responders. The issue of civilian decontamination is very foreign and perhaps even frightening to victims. They will be expressing many concerns for which they will be expecting answers.

Keep in mind, when victims express their specific concerns, they, too, can provide valuable information to assist emergency responders in identifying the source of exposure such as chemical clouds, nearby pesticide or other chemical use or storage sites.

Question or Concern of Victim	Information or Reply by First Responder
Why do you only want to remove some of my clothing, and nothing else?	As a precautionary measure. It is highly unlikely that any harm has come to you, but we strongly suspect that the hazard may have come in contact with your clothing only. Removing the outer layer of clothing is sufficient response to removing the hazard from you, and no further on-scene cleansing or decontamination is necessary.
Why do you want to remove some of clothing, and also decontaminate me?	As a precautionary measure. It is unlikely that any harm has come to you, but we do suspect that the hazard may have come into contact with your clothing and various surfaces of your skin. Taking a shower or allowing someone to assist you in decontamination is highly efficient in removing the hazard.
Why must I be decontaminated?	We have a reasonably strong belief that a substance, no matter how slight, has come into contact with you, and it must be removed. The best way to do that is by cleansing. Removing the substance will increase the likelihood that you will not become ill.
What is on me?	Tell them what you know or suspect.
Why was I singled out not to be decontaminated?	We determined that you were far enough away, or were not in the immediate vicinity so as not to have come into contact with the substance.
What part of me are you going to decontaminate or wash?	Explain accordingly.
Where will you decontaminate me?	Explain the procedure and location.
How will you decontaminate me?	Explain the procedure.
What do you use?	If you are instructed to cleanse yourself, we may provide soap, water, and towels. If we administer full decontamination, it will be just plain water, but lots of it. We might hand you a soft sponge to help sponge off the excess water. Sponging off is good because it helps remove surface contamination if there is any.
What should I do when I get home?	A nice long warm shower cannot hurt, but is unnecessary. When we release you from here, we have met our goals in removing suspect hazards from you.
Are you going to remove my clothing?	No – (explain why) Yes – (explain which items and why): This will vary, depending upon what part of your body we suspect might have been contaminated.

Question or Concern of Victim	Information or Reply by First Responder
What do you do with my clothing?	We will “bag” and mark it.
Will I get my clothing back?	If “Yes,” explain.
Why can't I have my clothing back?	It is our determination that they are soiled or contaminated too seriously, and a regular washing cycle will not adequately cleanse them. We will take responsibility for disposing of it.
If you give me my clothing back, what do I do with it? Isn't it dangerous?	No, it is not dangerous, or we could not give it back to you. We had you remove some clothing so as not to get it wet, or some of your clothing may be soiled, but it is not dangerous. When you get home, wash it immediately in a regular washing cycle in your washing machine. If you do not want to do this, you can dispose of your garments in the regular refuge.
Are you going to provide for privacy?	Be ready to explain the procedure.
Will you separate us by gender?	Be ready to explain the procedure.
What if I refuse?	Be ready to explain options.
What will I wear?	We will provide you with temporary or disposable garments
Will I be separated from my family?	There is that chance, but we will reunite you as soon as possible.
What about my personal belongings, jewelry, wallet, purse, cell phone?	If need be, we will collect and bag them separately from clothing, and mark them. They will be transferred to police, liaison officer, etc. and will be available for you to identify and pick up.
Who is going to lock up my business?	We can contact an associate of yours, and have them respond here to do that, or we or the police can do that for you. Do you have your keys with you?

Question or Concern of Victim	Information or Reply by First Responder
Do I have to go to the hospital or see a doctor?	Only if advised to do so. If it is urgent in our opinion that you should have medical attention, our system incorporates procedures for your immediate transportation. If it is advisable in our opinion that you should have follow-up medical attention only, you will be released to your own recognition for you to contact your personal doctor.
Am I going to get sick?	I am not a doctor, but if we all follow the procedures we are instituting, we will be doing everything possible to substantially reduce that possibility. Time is also of the essence, so the sooner we can attend to these details, the less likely an illness will prevail.
Do I need medicine?	You should ask that question of the doctor at the hospital when you arrive, or you should call your own personal physician and discuss the matter with him. If there are circumstances that later determine that medication is recommended, we will advise you.
Who pays for my medical treatment?	Be ready to provide an answer.

## Communicators

### E. Respected Public Communicators

One way to improve communication is to utilize a mediator, who is a respected public communicator, from within the community:

- Priests.
- Interpreters.
- Counselors.

Such communicators have spent arduous hours proving their credibility to and gaining the trust of the community. If the communicators believe in your emergency service agency's capabilities, and are willing to assist you in communicating directly to their community, their acceptance by the community may be extended to your agency.

## Protecting the Victims' Modesty

At a HazMat incident, removing clothing for decontamination in full view of the public, First Responders, and the media can be uncomfortable and traumatic for victims. This section generally highlights for First Responders the equipment options available to accommodate the victims' modesty concerns.

As time permits during a response to a hazardous material incident, emergency personnel should make all possible attempts to provide for modesty when victims are requested to remove their contaminated clothing, wash and rinse themselves, and re-clothe.



## **Covers**

The following are examples of equipment that can be quickly utilized and arranged in such a manner so as to provide emergency isolation and cover:

- Ladder trucks with salvage covers hung from the extended ladder section;
- Poles, ground ladders, or rope strung between fire engines and covered with salvage covers;
- Pop Up or compressed air tents; and
- Specialized manufactured decontamination vehicles that have built-in corridors for victims to walk through.

## **Gender**

In addition to providing cover, victims should be segregated by gender, and, if possible, have First Responders of the same gender assist them in disrobing, washing/rinsing and re-clothing as necessary.

## **Clothing Options**

After decontamination, the victims should be given clean clothing before exiting the covered decontamination corridors. The following clothing options are available from local area department stores, clothing manufacturers, restaurants, hotels, motels, hospitals, etc., to provide clean clothing items:

- Shirts.
- Pants.
- Sweatshirts.
- Sweatpants.
- Shoes.
- Jackets.
- Blankets.
- Large towels.
- Sheets.
- Gowns.
- Tablecloths.

Some re-clothing options to carry on response vehicles:

- Disposable ponchos, gowns or disposable coveralls.
- Large blankets, sheets, and towels.

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## **Handling Personal Items**

During a hazardous materials incident, personal items from victims may have to be collected due to contamination or to prevent water damage. First Responder agencies conducting a mass decontamination action need to develop a system for identifying, collecting, bagging, labeling, decontaminating, and retrieving these personal items. Responders tasked with the responsibility of implementing this system need to exercise dedication to preventing mistakes and misplacing items.

The system needs to be skillfully designed, instituted, and managed to ensure that the collected items find their way back to their rightful owners. Since valuable items such as wallets, loose money, palm pilots, jewelry, and cell phones may be collected, the First Responder agencies should include law enforcement into the design of this system and its actual implementation. A common responsibility of law enforcement is to function as the temporary recipient and controller of valuable items until such items can be returned to their rightful owners.

### **Proper Handling**

The system might consist of the following 6 phases for which the First Responder agencies need to develop procedures for:

Phase	Action
Phase 1: Declaration and Identification	Decide what garments and/or personal items may have to be collected from the victims. Announce the decision in a controlled environment prior to decontaminating victims. When clearly explaining the decision, ask all victims to be ready to assemble and turn over their items at a specific point in the process.
Phase 2: Collection and Bagging	Have available ample collection receptacles (bags, containers, etc.) for each victim. Be prepared to separate contaminated and non-contaminated items into separate receptacles.
Phase 3: Marking and Tagging	Mark and tag collected items and place in a receptacle in such a way as to properly identify the rightful owner. Maintaining a proper inventory at this stage is critical. Exercise dedication to prevent misplacing, mismarking or losing property. List each and every item collected on an inventory sheet. Provide the master inventory sheet to each victim and keep a copy. This phase needs to be skillfully designed and instituted to prevent overwhelming Logistics and jeopardizing the speed and efficiency at which the response needs to occur to ensure timely victim decontamination and treatment.
Phase 4: Arrange and Conduct Decontamination	Some items collected, most probably outer layer of clothing and shoes, should undergo decontamination as performed by selected trained First Responders, at a later time and place. The “triaging” of personal items should occur when declaring and identifying items for collection. Select a decontamination method. Inform victims when certain items should not or cannot be satisfactorily rendered safe by decontamination, and will need to be prepared for disposal. For example, leather shoes, belts, jackets, and other highly porous items may fit into this category.
Phase 5: Transfer to Law Enforcement (if necessary) for Long Term Safe Keeping	Include law enforcement in the collection process of personal items. First Responders will be handling a variety of very personal and highly valuable items. Insure the control and safe keeping of these items similar to evidence documentation and control exercised by law enforcement officials. Having them participate in this process will encourage that such discipline and control is applied. Valuable items should be turned over to law enforcement in a manner similar to their handling personal and valuable items at the scene of a crime or a fire.
Phase 6: Retrieval Procedures	Design and implement a system to insure items are properly returned to their respective owners. Include law enforcement personnel in this process to insure the proper release of items. Require identification for retrieval. Document what was turned over, and to whom.

## Collection

A collection and marking system may include the following variables and steps:

1. If not all personal items are contaminated, place them into one large receptacle for each victim.
  - a. Utilizing one receptacle per victim will ease and accelerate the collection process.
  - b. Three (3) mil thick heavy-duty trash bags may work.
2. If some items are possibly contaminated, separate them from non-contaminated ones, and bag them separately.
  - a. These items may need to undergo scrutiny later for possible decontamination, or recommendations for destruction and disposal.
  - b. Be sure to mark these containers accordingly and separately.
3. Utilize permanent or indelible marking devices whose ink will not run on contact with water or moisture. Consider using attachable tags that should include the following Information:
  - a. Name, address, phone number of victim.
  - b. List of items (or on a sheet of paper stuffed into the container or bag).
  - c. Name and an ID number of the individual collecting, bagging, and marking the bag.
  - d. Include a total number of items in the bag, and have the victim sign or initial it.
4. Provide a receipt to the victim that contains the same information as above.
  - a. The receipt should be water resistant.
  - b. The receipt could be placed inside a small sandwich bag;
5. When collecting items, compare information on the victim's driver's license or other I.D. to confirm ownership. If I.D. is not available, take a digital picture of individual displaying the I.D. number, or utilize another method.
6. If some items are deemed contaminated and require cleansing:
  - a. Identify those that can be easily decontaminated with soap and water without harm to the item. Such items could include some jewelry, coins, paper money, clothing, etc.
  - b. Identify those that might be damaged by a thorough washing, such as electronic equipment. Wiping the outer surfaces of these devices clean may be permissible and acceptable.
  - c. Identify those that would not benefit from any degree of decontamination, such as leather shoes, belts, and other highly porous items. These items should be recommended for disposal.
  - d. Identify those that may only need a precautionary laundering. First Responders may elect to launder these items. Or inform the victims that these items will be released to them for laundering at home in their washing machine using an ordinary laundry cycle, and such a wash will not harm the items; and

7. Inform the victims of the procedures to follow and where and when to retrieve personal items.
  - a. The retrieval process needs to be well planned and organized.
  - b. The inclusion of law enforcement's participation in this process is advisable.
  - c. Prepare to explain to selected individuals why some articles will not be returned. Have a full and reasonable explanation ready. For example, law enforcement may determine that some items are crucial to a criminal investigation.

**Personal Items**

The following partial list contains items that may be considered "personal items" and may require special handling:

• Outer Clothing	• Backpacks, Fanny Belts
• Jewelry	• Tobacco Products, Matches, Lighters
• Purses	• Pens, Pencils
• Wallets	• Loose Change, Trinkets
• Wrapped Packages	• Money Clips
• Keys	• Pagers
• Cell Phones	• Headphone Sets
• Walkmans	• Shopping Bags and Contents
• Carry-Out Prepared Food	• Miscellaneous Items

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**References**

1. Governor's Office of Emergency Services, *Risk Communication Guide for State and Local Agencies*. (See the OES website, <http://www.oes.ca.gov>).
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# CHAPTER FOUR

## HAZMAT AGENTS' EFFECTS WITH VICTIM TRIAGE AND DECONTAMINATION GUIDANCE

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### Introduction

This chapter describes some of the exposure effects that chemical, biological, and radiological agents can have on victims contaminated by them, and provides guidance to assist First Responders for triaging and decontaminating victims.

Not all of these agents require an emergency action on the part of the First Responder. This can work to the advantage of the First Responder, allowing time to consider the issues of cultural and language sensitivity, as well as public modesty, while preparing an effective decontamination plan.

**The victim triage and decontamination guidance included in this chapter are resources for First Responders to reference to determine an appropriate decontamination response to a HazMat incident. Suggested technical resource references are listed in Appendix 3.**

**The Victim Decontamination Guidance in this chapter is for only removing the victim's dermal contamination. If possible, allow coherent and cognizant ambulatory victims to remove their clothing and decontaminate themselves.**

**The decontamination solution suggested in this chapter is mild soap and water to wash the victims (See following section "*Decontamination Solutions*" for more information). This guidance document only endorses the use of this decontamination solution. When washing victim's eyes, flush with clear water only. Water used for flushing of eyes, wounds, etc. should be clean. Always wash victims from head-to-toe.**

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### Decontamination Solutions:

The "decontamination solution" endorsed by this document shall be mild soap and water. First Responder personnel should use no other so-called decontamination solutions in an arbitrary manor. Nor should carte blanche credence be given to the use of decontamination solutions, even if recommended by another organization. Considerable research is required to fully understand the intent and function of a decontamination solution. When prior research into the validity, acceptability, and use of decontamination solutions has not been exercised by a response organization, then an incident is not the time nor the place to examine and apply unorthodox decontamination methods.

More often than not, emergency response organizations have not examined all of the influential repercussions surrounding various decontamination solutions.

Reasons not to use these solutions is given here:

- Some people's skin is sensitive to many ordinary household chemicals. Even when diluted, some of these substances may trigger skin rash, dermatitis, and other allergic reactions;
- Civilians on certain medication may have heightened skin sensitivity;
- Children and the elderly have very sensitive skin. Imperceptible scratches, old wounds and abrasions would invite immediate irritation and/or a reaction;
- The Center for Disease Control (CDC) recommends a generic decontamination solution of mild soap and water; and
- The Medical Research Institute of Chemical Defense, Aberdeen Proving Ground, MD (US Army) recommends a generic decontamination solution of mild soap and water for chemical warfare agents.

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## **The World Of Chemical Agents:**

The vast majority of HazMat incidents resulting in the contamination of people involve common industrial chemical agents. With the advent of the emergency response community focusing on terrorism preparation, emphasis has been directed to other less familiar categories of chemical and toxic substances that have been refined and/or weaponized for use as tools in acts of terrorism. They are commonly summarized as "N," "B," "C," or "nuclear, biological and chemical" warfare agents. Presently very few HazMat incidents are attributed to these agents. However, they pose very unique health threats, some to a potentially catastrophic extent, and a re-examination of decontamination protocols and guidelines is in order. The study of all potential sources of contamination are best supported by looking at these chemicals in a categorical system. The categories that will be addressed and reviewed in this document are as follows:

## **Categories**

1. Industrial Chemicals.
2. Chemical Warfare Agents.
3. Biological Warfare Agents.
4. Radiological Materials.

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## 1. Industrial Chemicals:

There are tens of thousands of industrial chemicals. There are a number of ways to categorize them even further, but one of the most useful and popular is the Department of Transportation "Hazard Classification" which consists of eight primary hazard classes:

### Industrial Chemicals

Hazard Class Name	Hazard Class #	Example
Explosives	1.1 through 1.6	Nitro-glycerin
Compressed Gases	2.1 – Flammable	Propane
	2.2 – Non Flammable	Nitrogen
	2.3 – Toxic	Chlorine
	2.4 – Oxidizing	Oxygen
Flammable Liquids	3	Acetone
Flammable Solids	4.1 through 4.3	White Phosphorus
Oxidizers	5.1 and 5.2	Benzoyl Peroxide
Toxic Substances	6.1 – Toxic	Pesticides
	6.2 – Infectious	Disease Cultures
Radiological	7	Uranium
Corrosive	8	Acids, Alkalines



## 2. Chemical Warfare Agents:

Some chemical warfare agents are nothing more than industrial chemicals that are highly refined and engineered to be highly toxic or lethal. Other chemical warfare agents, such as Lewisite or VX, are so unique that they have little or no common tie to the industrial world, and were developed solely for warfare use:

### Chemical Warfare Agents

Classification	Examples
Nerve Agents	Sarin, Soman, Tabun
Blood Agents	Hydrogen Cyanide, Cyanogen Chloride
Choking Agents	Chlorine, Phosgene
Blister Agents	Lewisite, Mustard (HD), Phosgene Oxime
Incapacitating	Tear Gas, Mace, Capsicum

## 3. Biological Warfare Agents:

Biological warfare agents are not chemical substances, but are living organisms, cultures, and diseases. They can be categorized as follows:

### Biological Warfare Agents

Category	Examples
Virus	Small Pox, Common Flu, Ebola
Rickettsia	Typhus, Q-Fever
Bacteria	Anthrax, Plague, Cholera
Toxins	Ricin, Botulism
Prions	Mad Cow Disease

#### 4. Radiological Materials:

Radiological materials are substances that emit ionizing radiation. Industry produces the majority of radioactive materials in use today. A majority of these radiological substances are isotopes produced by industry. Another source of radiological materials are those manufactured for military applications. They are addressed in a separate category not only because of the concern that they may be attractive to a terrorist as a source of causing harm, but also because the ionizing radiation is a very unique hazard requiring specific and specialized study. They can be categorized as follows:

#### Radiological Materials

Category	Examples
Weaponized Sources	Uranium 235, 238, Plutonium 240
Reactor Sources	Uranium 235, 238, Plutonium 239
Medical Instruments	Cobalt 60, Cesium 136
Medical Substances	Iodine 131, Barium 139
Industrial Instruments	Potassium 43, Barium 141, Cesium 137

**Contamination Factors** All of these chemicals have the potential to travel great distance, contaminate large areas, and contaminate victims based upon a combination of site and incident specific factors. Many of these factors may influence the need for and the degree of decontamination, including civilian decontamination. Some of these factors may be:

**Contamination Factors**

<b>Factors</b>	<b>Influence</b>
Toxicity	Depends on hazardous material.
Physical State	Gaseous substances, aerosolized liquids, and dusts or powders all behave differently when airborne.
Persistency	Some substances do not dissipate rapidly, but instead settle out onto surfaces of objects, floors, and walls.
Quantity Released	The greater the quantity released, the greater the contamination threat.
Duration of Release	The longer the release, the greater the contamination threat.
Method of Release	Incident specific.
Distance from Source	The greater the distance from a release source, contamination threat diminishes.
Vapor Pressure	The higher the VP, the more the vapor will disperse with wind drift.
Wind Speed, Direction	Can channel or direct a contaminant toward or away from densely populated areas.
Temperature	Increased temperature promotes dissipation, and perhaps a larger downwind contaminated area.
Local Topography	Gullies, recesses, basements, canyons may "trap" and slow dissipation, encouraging "fallout" of a contaminant.
Confining Spaces	Confines a contaminant, and increases potential for more surface areas to be contaminated in a small area.

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## Industrial Chemicals

Unforeseen or unexpected releases of industrial chemicals have led to human contamination and exposure. Solid, liquid, and gaseous industrial chemicals all pose a threat to the public's health and safety. It is a misconception to presume that gaseous types pose the greatest contamination threat. It is true that gaseous substances are largely uncontrollable when directly released into the air, and can drift throughout the community contaminating the public. However, liquid and solid forms of potentially toxic and/or dangerous chemicals can also pose a significant contamination risk. A full understanding of the circumstances that contribute to a substances' contamination threat starts with appreciating its physical form. Three very unique physical factors greatly influence the potential for contamination threat, and these three physical factors are directly related to the substances' physical form. Those factors are:

## Physical Factors

### A. Persistency:

Persistency of a substance is its desire to remain for long periods of time where it has settled out. It also refers to a chemical's duration of effectiveness after it has been dispersed. The longer a substance remains potent and settled out in one location, the higher its "persistency" rating. Solids, particularly in the form of powders, and some high viscous liquids, are rated with a "high" persistency. An agent is considered to be "persistent" if it remains for 24 hours or longer, and "non-persistent" if it evaporates and/or dissipates within 24 hours. A demonstration of the range of persistency among various chemical warfare agents is as follows:

Chemical Warfare Agent Persistency		
Most Persistent	Least Migration	VX Tabun Mustard Agents Lewisite Sarin MACE Hydrogen Cyanide Phosgene (gas) Chlorine (gas)
Least Persistent	Most Migration	

### B. Stability:

Stability is with regard to how long a substance remains in the environment without breaking down. All substances degrade but with varying rates of speed. Some degrade very rapidly, and others may remain for years or centuries. For example, some highly toxic industrial gases, even though they have a very high migration potential, have an extremely high stability rating, such as many halogen base gases, cyanides, and chlorine.

### C. Migration:

Migration refers to a substances' ability to move freely away from its point of release. The further the distance of travel, the greater the migration threat, and thus the contamination spread potential. Most gases can travel long distances before settling out and contaminating surfaces, with the lighter gases traveling the greater distances. Furthermore, wind drift, ambient temperature, and humidity also contribute to gaseous migration potential, and must be taken into consideration.

Note that migration is not just limited to the gaseous state. It can also refer to the liquid state or to the solid (powder) state. Liquid migration is directly affected by the degree of incline of flat surfaces, and thus can obviously affect and contribute to contamination threat and migration potential. Powders do have a higher affinity to settle out of the atmosphere as compared to gaseous substances, but nevertheless can travel great distances, and are also affected by wind drift and humidity.

#### Contamination Risk factors

	<b>PERSISTENCY</b> (Longevity in the Environment)		<b>Stability</b> (Resists Breaking Down)	<b>Migration</b> (Contamination Spread Potential)	
<b>Solids:</b> (Most important is Powders)	High	Heavy dusts	Moderate to very high	Very Low	Dusts, powders, if no wind
	Very High	Highly refined powders		Medium	If wind; Tracking by People
<b>Liquids:</b>	Low	Highly volatile liquids	Moderate to very high (except organophosphate pesticides, which are very low)	Low	Flat surfaces
	Medium	Low volatile liquids, heavy liquids, chlorinated hydrocarbons		High	Sloping surfaces
<b>Gases:</b> (Including Aerosols)	Low (migrate in air easily)		Mostly very high	Very High	

Distance from the source is also a critical factor to consider when responding to HazMat incidents; the farther away from the source, the less likely the public will be contaminated. However, this is a general guideline and each incident will need to be evaluated for the appropriate actions by the First Responders.

The number of chemicals produced by industry is so large, that it is impossible to point out all their individual effects and provide victim triage and decontamination guidance for them all. Many other notable and reliable reference sources on decontamination are available and contain valuable information on specific

chemicals. Therefore, this section will only provide one general victim triage and decontamination guideline for industrial chemicals, except pesticides, which will be addressed separately.

## **Triage**

### **Industrial Chemical Victim Triage**

#### **High Priority for Decontamination:**

- Victims closest to point of release and reporting exposure.
- Victims showing some evidence of contamination on clothing or skin.
- Victims demonstrating serious symptoms.

#### **Medium Priority for Decontamination:**

- Victims not as close to point of release, and who have minimal evidence of contamination on clothing or skin.
- Victims who are mildly symptomatic.

#### **Low Priority for Decontamination:**

- Victims who are far away from point of release.
- Victims who have no verified contamination.
- Victims who are asymptomatic.

## **Decontamination**

### **Industrial Chemical Victim Decontamination**

High priority victims should be evaluated for the need for decontamination, as well as the degree to which decontamination should be applied. Medium priority victims may only require a cosmetic decontamination (face and hands). Low priority victims should not need decontamination. The following are suggested basic decontamination steps for industrial chemicals:

#### **Basic Decontamination Steps:**

1. Protect yourself by wearing appropriate personal protective equipment.
2. Address humanitarian concerns/public modesty if possible.
3. Allow for communication in victim's own language if possible.
4. Remove victim from contaminated area.
5. Remove only that clothing which is necessary.
6. Collect, bag, label and inventory personal items.
7. Provide gross water rinse (2-5 minutes).
8. Place clothing and personal items in a container.
9. Label or tag container and victim.
10. Wash victim with mild soap and water only.
11. Rinse victim with water (2-5 minutes).
12. Provide victim with clean clothing and towel.
13. Monitor victim's vital signs.
14. Prepare for transportation to medical facility as warranted, or release to self for return to home.

**Always Wash and Rinse in a head-to-toe fashion. If eye irritation is present, flush eyes with water for 15 minutes or longer.**

## Pesticides

### ► Pesticides – A Special Focus

Pesticides are industrial chemicals. They are addressed here as a special case because they are produced in large quantities, present obvious and sometimes unique health and environmental threats, and deserve special attention. They are predominantly included in the D.O.T. Hazard Classification # 6 (Poisons). The term “pesticide” is a generic term, and refers to all industrial chemicals manufactured for the purpose of eradicating all forms of pests. Pesticides include numerous sub-groupings of chemicals, each designed to kill or control a specific category of pests. Some examples are:

- Insecticides
- Fungicides
- Herbicides
- Rodenticides
- Ovicides
- Miticides
- Fumigants

Agricultural industrial chemicals, such as pesticides, are largely manufactured in accordance with three (3) chemical classes:

- Chlorinated Hydrocarbons
- Organophosphates
- Carbamates.

It is very important that the First Responder understands the subtle differences between these three chemical classes, as they also can dictate different emergency response intervention techniques, as well as slightly different decontamination concerns.

**Chemical Classes Table**

<b>Chemical Classes</b>	<b>Primary chemical</b>	<b>Bio-degrades</b>	<b>Example</b>
<b><i>Chlorinated Hydrocarbons</i></b>	Chlorine	Extremely persistent; UV has little effect; most are banned.	Lindane; Endosulfan
<b><i>Organophosphates</i></b>	Phosphorous	Degraded by UV within days; Low to moderate persistency	Methyl Parathion; Malathion;
<b><i>Carbamates</i></b>	Phosphorous and often Nitrogen	Degraded by UV within days; Low to moderate persistency	Lannate; Temik

**Chemical Classes**

**Chlorinated Hydrocarbons:**

Chlorinated hydrocarbons have proven to be highly persistent to a catastrophic degree. They are terribly polluting to the environment, particularly to soil and underground water tables. Their manufacture and use in the U.S.A. is largely banned and/or highly restricted today. Absorption through the skin is slow to moderate. However, once absorbed into the body of a living creature, chlorinated hydrocarbons are not easily flushed out by the body and have a strong affinity to permeate fatty tissue.

Cleansing exposed or contaminated skin is easily accomplished by use of mild soap that suds up well (a surfactant), followed by copious rinsing. Most of these substances do have antidotal treatment available.

**Organophosphates and Carbamates:**

These pesticides are the most popular today. They are easily biodegradable by exposure to sunlight. They usually degrade within days of application. So long as this chemical is not washed off to mix into the soil, they are not considered long term persistent. Absorption through the skin can be very high and quick. Cleansing exposed skin is accomplished by immediate use of a mild soap that suds up well, and copious rinsing. Carbamates often contain nitrogen in their chemical makeup that alters slightly both their action on the pest, as well as medical treatment due to poisoning. Most have antidotal treatment specific to phosphate or carbamate poisoning.



## Exposure Information

### Exposure Information

Pesticides are often applied to agricultural fields and crops in a controlled fashion. However, unforeseen or unexpected environmental changes, during or after application, can and have led to human contamination and exposure. Furthermore, malfunctioning application equipment, human error or noncompliance with product label requirements can and have resulted in an uncontrolled release of agricultural chemicals into the environment, contaminating and exposing fieldworkers and the public. In addition to such unanticipated events related to the application, fieldworkers are routinely exposed to varying levels of aged pesticide residues while working.

Growers, applicators, and field workers are at more risk than is the public to pesticide contamination and exposure because they work with or are exposed to the product more often. However, concentrated pesticides can still find their way into the community, and situations involving accidental or intentional poisoning and/or contamination can threaten the public. Some examples are:

- Crop duster crash.
- Accident at an agricultural hangar.
- Accident at a bulk processing or packaging plant.
- Accident at a retail outlet.
- Pesticide transport vehicle accident.
- Pesticide drift onto vehicles, workers, or the public.
- Children playing unsupervised in storage rooms.
- Attempts at self-induced suicide using pesticide substances.

Agricultural chemicals that drift or off-gas into the community are generally diluted prior to use, and therefore, are less hazardous than their concentrated forms. However, diluted pesticides are still a concern to the public's health and safety and require appropriate emergency response actions to remove potential contamination and possible exposure threats. An exception is fumigants, which are not diluted.

Exposure routes for agricultural chemicals poisoning are:

- Inhalation;
- Dermal, and
- Ingestion

## Resources

### Information Resources:

The pesticide product labels are a valuable source of information. A typical pesticide product label contains a volume of information, including safety warnings, precautionary statements, and emergency procedures, all of which is of value for the First Responder. This information is required to be a part of every pesticide label per federal EPA regulation. Pesticide labels must be available at a mixing/loading site. Some examples of valuable information useful to the First Responder that may be found on a typical label are:

- Active and inactive ingredients
- Toxicity rating based on “signal words” (Danger, Warning, Caution)
- Typical symptoms of poisoning
- Immediate first aid treatment
- Antidote recommendations, if any
- Notes of physician
- Reactivity (with water, sunlight, heat, cold)

An additional source of valuable information would be the appropriate Material Safety Data Sheet (MSDS). These should be available at manufacturing, packaging, storage, loading, and transportation facilities. An MSDS may have additional information regarding incident intervention, containment, first aid recommendations, and decontamination suggestions.

Another reliable source of information is the local County Agricultural Commissioner’s Office. They can often be contacted during the emergency for additional technical expertise, and may send a representative to the incident. The Agricultural Commissioner is often familiar with product labels and local applicators and can access pesticide use records to identify the product used.

## Effects

### **Effects of Chlorinated Hydrocarbon Pesticides:**

- Headaches
- Nausea
- Vomiting
- Dizziness
- Blurred Vision
- Mental Confusion
- Drowsiness
- Tremor
- Numbness
- Abdominal pain
- Caustic irritant of skin, eyes, and respiratory tract

### **Effects of Organophosphate and Carbamate Pesticides:**

- Headaches;
- Nausea;
- Dizziness;
- Blurred vision;
- Hypersecretion, manifested by sweating, salivation, tears, and runny nose; and
- Severe poisoning: muscle twitching, weakness, tremor, incoordination, vomiting, abdominal cramps, diarrhea, incontinence, slow heart rate, pinpoint pupils, respiratory depression, convulsion, coma.
- Caustic irritant of skin, eyes, and respiratory tract.

**Symptoms generally develop fairly rapidly, but delays of up to 24 hours post-exposure are not uncommon.**

## **Triage**

### **Pesticide Victim Triage**

#### **High Priority for Decontamination:**

- High Density Drift
- Outer and inner clothing/skin wet from drift
- Possible symptoms manifest
- Refer to Pesticides Victim Decontamination

#### **Medium Priority for Decontamination:**

- Medium Density Drift
- Outer clothing/skin damp from drift
- Possible symptoms manifest
- Refer to Pesticides Victim Decontamination

#### **Low Priority for Decontamination:**

- Low Density Drift
- Skin or clothing not damp from drift
- No symptoms manifest
- May complain of odor
- Clothing removal is optional but suggested
- Contaminated clothing can be washed in a standard home laundry
- Refer to Pesticides Victim Decontamination if necessary

**In all Cases: If eye irritation is present, flush eyes with clean water for 15 minutes and transport for medical attention.**

## **Decontamination**

### **Pesticides Victim Decontamination**

1. Protect yourself by wearing appropriate personal protective equipment.
2. Address humanitarian concerns/public modesty if possible.
3. Allow for communication in victim's own language if possible.
4. Remove victim from contaminated area.
5. Remove all of the victim's clothing and personal items.
6. Collect, bag, label and inventory personal items.
7. Provide gross water rinse (2-5 minutes).
8. Place clothing and personal items in a container.
9. Label or tag container and victim.
10. Wash victim with mild soap and water only.
11. Rinse victim with water (2-5 minutes).
12. Provide victim with clean clothing and towel.
13. Monitor victim's vital signs.
14. Prepare for transportation to medical facility as warranted, or release for return home.

**Always Wash and Rinse in a head-to-toe fashion. If eye irritation is present, flush eyes with water for 15 minutes or longer.**

## Fumigants

Fumigants differ from other pesticides due to their gaseous nature and their ability to penetrate biological membranes. The skin and linings of the respiratory and gastro-intestinal tracts rapidly absorb fumigants. Their gaseous state enables them to reach the alveoli where they are rapidly and efficiently absorbed.

Triaging victims for fumigant exposure is different from other pesticides because of their gaseous state.

## Effects

### Effects of Fumigants

- Pulmonary Edema
- Respiratory complications
- Headaches
- Dizziness
- Nausea
- Caustic irritant to skin, eyes and respiratory tract.

## Triage

### Fumigants Victim Triage

#### **High Priority for Decontamination:**

- Potential Source Nearby (Less than 400 meters, 1320 feet, ¼ mile away)
- If evacuation has been recommended or is required have people vacate the area until fumigant dissipates. Area evacuation is an option, especially if indication (by measuring devices, or environmental conditions or from judgment of incident commander) suggests a potentially hazardous level of fumigant may be off-gassing.
- After dissipation, persons with home/offices in the immediate vicinity shall be advised to open their windows or otherwise allow air circulation to dissipate any gas introduced into the structure.
- Clothing must be removed.
- Decontaminate victims if warranted.

#### **Medium Priority for Decontamination:**

- Potential Source Moderately Close (Between 400 meters, 1320 feet, ¼ mile to 800 meters, 2640 feet, ½ mile away)
- Persons within 300 to 1,000 meters of a suspected source of off-gassing fumigant shall be advised to keep windows, doors and any other large connection to outdoors closed until the fumigant dissipates.
- Evacuation may be necessary.
- After dissipation, persons with homes/offices in the immediate vicinity shall be advised to open their windows or otherwise allow air circulation to dissipate any gas introduced into the structure.
- May need to remove clothing.
- Decontaminate victims if warranted.

#### **Low Priority for Decontamination:**

- Potential Source Distant (Greater than 800 meters, 2640 feet, ½ mile away).

- Evacuation of people may be necessary.
- In outdoor settings, disappearance of initial triggering odor may be considered evidence of dissipation.
- After dissipation, persons with homes/offices in the immediate vicinity shall be advised to open their windows or otherwise allow air circulation to dissipate any gas introduced into the structure.
- Removal of clothing is not required.
- Decontamination is not warranted.

## Decontamination

### Fumigants Victim Decontamination

1. Protect yourself by wearing appropriate personal protective equipment.
2. Address humanitarian concerns/public modesty if possible.
3. Allow for communication in victim's own language if possible.
4. Remove victim from contaminated area.
5. Remove all of the victim's clothing (depending on triage priority) and personal items.
6. Collect, bag, label and inventory personal items.
7. Provide gross water rinse if necessary (2-5 minutes).
8. Place clothing and personal items in a container.
9. Label or tag container and victim.
10. Wash victim with mild soap and water only.
11. Rinse victim with water (2-5 minutes).
12. Provide victim with clean clothing and towel.
13. Monitor victim's vital signs.
14. Prepare for transportation to medical facility and/or emergency shelter or release to home, as warranted.
15. If decontamination is not warranted, recommend to the public to perform general hygiene wash.

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## Chemical Warfare Agents

Chemical warfare agents are a special category of chemicals that have been specifically formulated and refined to kill, maim, incapacitate or injure soldiers on the battlefields. These agents have proven to be very attractive to terrorists. Terrorists can design methods to use them to evoke the same level of harm and mortality to civilians. Hence, they are sometimes referred to as “weapons of mass destruction.” There are already many instances where chemical warfare agents have been used by terrorists on civilians. The World Trade Center (1993) and Oklahoma City (1995) bombings; the release of the substance Sarin, a nerve agent, in the subways of Tokyo (1995), by the religious extremist group Aum Shinrikyo; and the World Trade Center and Pentagon attacks (2001).

## FBI WMD Response Guidelines Appendix 4

**It is important to note that it is a criminal act to make a threat or use any weapon for mass destruction and any act should be reported to the Federal Bureau of Investigation (FBI) immediately. It is important to work with law enforcement during such an incident to ensure the proper collection of evidence. Appendix 4 contains the FBI WMD Response Guidelines.**

## Classifying Chemical Warfare Agents

Chemical warfare agents vary considerably in their properties, their intended result, and in their effects on people. Accordingly, chemical warfare agents can be categorized with respect to their intended harm. Generally, they are grouped into one of five categories as shown in the table below:

### Chemical Warfare Agents Classifications

Classification	Method of Harm	Degree of Harm	Examples
<b>Nerve Agents</b>	Cholinesterase inhibitor	Extremely lethal; fast acting; dermal absorption	Sarin, Soman, Tabun
<b>Blood Agents</b>	Hemoglobin destruction, or oxygen blocking	Best when inhaled; some are fast acting; highly lethal, if concentrated	Hydrogen Cyanide, Cyanogen Chloride
<b>Choking Agents</b>	Suffocation, respiratory paralysis	Lethal, but can be reversed with medical aid	Chlorine, Phosgene
<b>Blister Agents</b>	Blistering of skin, respiratory system	Excruciating pain; terribly incapacitating; disfiguring	Lewisite, Mustard (HD), Phosgene Oxime
<b>Incapacitating</b>	Temporarily render inoperative	None major; recovery is slow to swift	Tear Gas, Mace, Capsicum

These agents vary widely in physical composition, including ultra-fine powders (i.e. Mace) mists and aerosols of heavy liquids (i.e. Sarin, Mustard Agents, Lewisite), and gases (i.e. Phosgene Oxime). With many of these agents, not only are the chemical properties attractive to a terrorist, but also so are some of the unique hazards as presented by the physical properties.

- Aerosolized nerve agents permeate skin rapidly, with no pain sensation.
- Gaseous blood agents are rapidly absorbed by the lungs with little or no sensation or irritation.
- Gaseous choking agents trigger the choking reflex, which can cause suffocation associated with great pain.
- Powder or liquid blister agents begin painful skin destruction immediately, but do not penetrate deeply.

Therefore the First Responder must execute procedures on scene immediately to try to ascertain what the warfare agent is. Proper triaging, first aid, decontamination, and recommendations for follow up medical aid are directly dependent upon the accuracy of this information.

Liquid chemical warfare agents can vary widely in their volatility, with higher volatility liquids producing the most vapors at the most rapid rate. Phosgene and cyanides evaporate rapidly to produce a vapor, while the heavier and thicker liquid mustard agents and liquid nerve agents vaporizes very slowly. To encourage airborne dispersion, the heavier liquids are prone to be aerosolized by a terrorist. Elevated temperatures will also encourage these agents to produce more vapors. The vapor form of these agents, with the exception of Hydrogen Cyanide, is heavier than air. The vapors will, therefore, sink and/or collect into ditches, gullies, trenches, basements, and confined or closed rooms.

## **Nerve Agents**

### **1. Nerve Agent Examples**

(Sarin, Tabun, Soman, and VX)

### **2. How Nerve Agents Work**

Nerve Agents inhibit the enzyme cholinesterase at nerve endings, resulting in a buildup of excessive acetylcholine. This interferes with transmission of the message from the nerve to the organ. The nerve is normal but the transmission to the organ (muscle, gland) is faulty. This causes too much activity in muscles observed as twitching.

### **3. Nerve Agents Symptoms**

Effects begin within 30 minutes to 18 hours depending upon the dose received.

### **Liquid On Skin:**

**Very small amount** – Sweating, twitching at contact point.

**One drop** – Nausea, vomiting, diarrhea, weakness, spasms.

**Large dose** – Convulsions, stopped breathing, paralysis.

### **Inhalation:**

Hypersalivation, sweating, abdominal cramps, sweating, diarrhea, muscle weakness and spasms, small pupils, tightness in chest, shortness of breath, convulsions, paralysis, stopped breathing, coma, and heart stoppage. Death is due to respiratory muscle paralysis.

## **4. Nerve Agents Triage**

### **High Priority (Immediate) for Decontamination:**

- Victims with convulsions, not breathing, labored breathing.
- Having two or more organ systems affected.
- Serious disturbances in consciousness, seizures.
- Require antidote and oxygen immediately.
- Hospitalization is required.

### **Medium Priority (Delayed) for Decontamination:**

- Victims with suspected skin contamination to liquid agent.
- Exhibiting no immediate outward effects.
- Victims demonstrating positive antidote recovery.
- Must be kept under observation for at least 18 hours.

### **Low Priority (Minimal) for Decontamination:**

- Victims walking and talking after vapor or liquid exposure.
- Some with shortness of breath, miosis (antidote recommended).
- Some with vomiting (antidote recommended).
- Must be kept under observation for at least 18 hours.

## **5. Nerve Agents Decontamination**

All high and some medium priority victims should be evaluated for the need for decontamination, the urgency for decontamination, as well as the degree to which decontamination should be applied. Medium priority victims may only require a cosmetic decontamination (face and hands). Low priority victims should not need decontamination.

Most high priority victims will not be able to physically decontaminate themselves due to their progression of symptoms. Medium priority victims might be able to follow directions in a mass decontamination situation and wash themselves. The following are suggested basic decontamination steps for nerve agents:



1. Only appropriate personal protective equipment certified for chemical warfare substances should be used.
2. Address humanitarian concerns/public modesty if possible.
3. Allow for communication in victim's own language if possible.
4. Remove victim from contaminated area.
5. Remove only that clothing which is necessary.
6. Collect, bag, label and inventory personal items.
7. Provide gross water rinse (2-5 minutes).
8. Place clothing and personal items in a container.
9. Label or tag container and victim.
10. Wash victim with mild soap and water only.
11. Rinse victim with water (2-5 minutes).
12. Provide victim with clean clothing and towel.
13. Provide oxygen.
14. Make arrangements to administer antidote as warranted.
15. Monitor victim's vital signs and continue with medical screening.
16. If High or Medium Priority, prepare for immediate transportation to medical facility as warranted.
17. If Low Priority, release for return home.

**Always Wash and Rinse in a head-to-toe fashion. If eye irritation is present, flush eyes with water for 15 minutes or longer.**

## **Blood Agents**

### **1. Blood Agents Examples**

Hydrogen cyanide, Cyanogen chloride, Arsine.

### **2. How Blood Agents Work**

Cyanides prevent cells from using oxygen and this causes cell death. As a result, oxygen builds up in the blood, often giving the skin a very reddish color. The brain is most immediately affected. Arsine actually damages the blood, kidney and liver, and gives the skin a pale yellow color similar to jaundice.

### 3. **Blood Agents Symptoms**

Symptoms of Cyanide poisoning may be slightly delayed, as the body begins to flush out the Cyanide, but eventually becomes overwhelmed. Cyanogens and Arsine are highly irritating and their presence is often detected quickly by the respiratory tract.

#### **Cyanides:**

- **Small Amount** -- No effects, or slight lightheadedness, dizziness.
- **Medium Amount** -- Irritation, nausea, feeling of weakness.
- **Large Amount** -- Unconsciousness, convulsions, breathing stops, death.

First effects may occur within seconds.

#### **Cyanogens:**

- **Small Amount** – Irritation, giddiness, nausea, weakness.
- **Large Amount** – Unconsciousness, convulsions.

### 4. **Blood Agents Triage**

#### **High Priority for Decontamination:**

- Victims with convulsions, apnea (breathing stops), and/or no cardiac activity. Require antidote and oxygen immediately.

#### **Medium Priority for Decontamination:**

- Victims recovering from severe acute effects (unconscious, but breathing). Require antidote and oxygen to hasten recovery.

#### **Low Priority for Decontamination:**

- Victims who are asymptomatic more than few a minutes after exposure to vapor. No antidote or oxygen required.

### 5. **Blood Agents Decontamination**

All high and some medium priority victims should be evaluated for the need for decontamination, the urgency for decontamination, as well as the degree to which decontamination should be applied. Medium priority victims may only require a cosmetic decontamination (face and hands). Low priority victims should not need decontamination. Remember, these blood agents are gases, and are not considered persistent.

Most high priority victims will not be able to physically decontaminate themselves due to the progression of symptoms. Medium priority victims might be able to follow directions in a mass decontamination situation and wash themselves. The following are suggested basic decontamination steps for blood agents:

1. Only appropriate personal protective equipment certified for chemical warfare substances should be used.
2. Address humanitarian concerns/public modesty if possible.
3. Allow for communication in victim's own language if possible.
4. Remove victim from contaminated area.
5. Remove only that clothing which is necessary.
6. Collect, bag, label and inventory personal items.
7. Provide gross water rinse (2-5 minutes).
8. Place clothing and personal items in a container.
9. Label or tag container and victim.
10. Wash victim with mild soap and water only.
11. Rinse victim with water (2-5 minutes).
12. Provide victim with clean clothing and towel.
13. Provide oxygen.
14. Make arrangements to administer antidote as warranted.
15. Monitor victim's vital signs and continue with medical screening.
16. If High or Medium Priority, prepare for immediate transportation to medical facility as warranted.
17. If Low Priority, release for return home.

**Always Wash and Rinse in a head-to-toe fashion. If eye irritation is present, flush eyes with water for 15 minutes or longer.**

## **Blister Agents (Vesicants)**

### **1. Blister Agents Examples**

Mustard, Sulfur Mustard, Nitrogen Mustard, Lewisite, Phosgene Oxime

### **2. How Blister Agents Work**

Both produce excruciating pain, often accompanied by grayish tissue damage. They destroy cells. Mustards can penetrate into skin and fatty tissue with delayed sensations, and destroys protein, DNA, and bone marrow.

### 3. **Blister Agents Symptoms**

Upon contact with the skin or eyes, outward symptoms of Mustard Agents are typically delayed from 2 to 24 hours. However, tissue destruction has begun. Then a burning sensation sets in with increasing intensity. Symptoms of Lewisite and Phosgene Oxime contact on the other hand are immediate. If inhaled, Lewisite can be fatal.

#### **Mustard Agents:**

- **Early effects** – Reddening of skin, itching, nausea.
- **Advanced effects** – Vomiting, blisters, lesions, nosebleed, severe pain.

#### **Lewisite and Phosgene Oxime:**

- **Early effects** - Very irritating, pain on contact, especially to eyes, tissue damage evident within minutes.
- **Advanced effects** – Large blisters, lesions, vomiting, diarrhea, and low blood pressure.

### 4. **Blister Agents Triage**

#### **High Priority for Decontamination:**

- Victims whose airway is affected within several hours after exposure. Treat for immediate intensive pulmonary care. Victims having skin or eye lesions, or just simple reddening of the skin. Symptomatic care is needed but will not reduce damage. With Mustard agents, demonstrating delay in sensation or damage, those civilians suspected of coming into contact with these agents should also be strong candidates for decontamination.

#### **Low Priority for Decontamination:**

- Victims showing no skin irritation, lesions, or redness to the eyes, and there is strong confirmation that Blister agents were not present.
- If confirmation is not possible and Blister agents are suspected as being present, hygiene wash of all exposed dermal area is recommended.

### 5. **Blister Agents Decontamination**

Strong consideration should be given to cleanse or decontaminate all high priority victims. It is urgent to apply procedures to remove blister agent substances from skin surfaces so as to halt or at least diminish tissue damage. If there is reddening of skin, or evidence of skin blistering or tissue damage, do not use any mild soap solutions unless instructed to do so by an attending physician or physician-on-scene - use plain water only. The following are suggested basic decontamination steps for blister agents:

1. Only appropriate personal protective equipment certified for chemical warfare substances should be used
2. Address humanitarian concerns/public modesty if possible.
3. Allow for communication in victim's own language if possible.
4. Remove victim from contaminated area.
5. Remove only that clothing which is necessary.
6. Collect, bag, label and inventory personal items.
7. Provide gross water rinse (2-5 minutes).
8. Place clothing and personal items in a container.
9. Label or tag container and victim.
10. Wash and rinse victim with water only (2-5 minutes).
11. Provide victim with clean clothing and towel.
12. Provide oxygen if in respiratory distress.
13. Monitor victim's vital signs and continue with medical screening.
14. If High Priority, prepare for immediate transportation to medical facility as warranted.
15. If Low Priority, release for return home.

**Always Wash and Rinse in a head-to-toe fashion. If eye irritation is present, flush eyes with water for 15 minutes or longer.**

**Choking Agents  
(Pulmonary):**

1. **Choking Agents Examples**

Chlorine, Phosgene, Diphosgene

2. **How Choking Agents Work**

Choking (pulmonary) agents destroy cells in the respiratory system through a corrosive action. They also damage the membranes in the lung that separate the alveolus (air sac) from the capillary. The damaged membrane allows plasma from the blood to leak into the alveoli, filling them with fluid and preventing air from entering, leading to suffocation.

### 3. Choking Agents Symptoms

Outward symptoms of a large exposure usually initiates immediate and highly irritating pain in the nasal passage and the throat. Prolonged exposure may trigger the body to restrict the air passage, causing involuntary choking, which if not interrupted, can lead to death by suffocation and oxygen exclusion. Symptoms can be short-lived, as long as the victim is removed to fresh air immediately.

- **Small or short exposure** - Shortness of breath (dyspnea) – at first with exertion, later at rest, difficulty breathing, pain in chest;
- **Large or extended exposure** - Cough – initially hacking cough, later with frothy sputum, edema, bleeding in lungs, choking spasms, suffocation, and unconsciousness.

**Effects begin essentially immediately for single massive exposure, and 2 to 24 hours delay for a mild or short exposure.**

### 4. Choking Agents Triage

#### **High Priority for Decontamination:**

- Only those victims that have been enveloped in a dense cloud of a choking agent, or splashed with liquid of the choking agent, should be considered for possible decontamination.

#### **Low Priority for Decontamination:**

- Victims subjected to a short or intermittent vapor exposure of a choking agent do not need to undergo decontamination. Medical attention to stabilize respiratory distress is the high priority.

### 5. Choking Agents Decontamination

All victims should be evaluated for the need for decontamination, the urgency for decontamination, as well as the degree to which decontamination should be applied. Most will only require removal of the outer layer of clothing, and nothing more. Remember, these choking agents are gases that migrate rapidly, do not persist, and are not absorbed through the skin.

Most high priority victims may not be able to physically remove clothing or effect casual hygiene cleansing themselves due to the onset of severe respiratory pain. Consideration must be given to assist in such cases. The following are suggested basic decontamination steps for choking agents:

1. Self-protection may be provided using turnout gear and Self Contained Breathing Apparatus (SCBA).
2. Remove victim from contaminated area rapidly.
3. Address humanitarian concerns/public modesty if possible.
4. Allow for communication in victim's own language if possible.
5. Remove only that clothing which may have come into contact with liquid.
  - Remove only the outer layer of clothing if contact was gaseous.
  - Removal of other layers of clothing may not be necessary if exposure was gaseous and was short or intermittent.
6. If it is determined that a whole body wash is recommended, follow decontamination recommendations for Industrial Chemical.
  - Otherwise, wash affected area with mild soap and water.
  - Rinse 2-5 minutes with water.
  - Only the area in contact with liquid should need cleansing.
  - Full body decontamination is not necessary.
  - If clothing is removed as a precaution due to possible "off-gassing," and exposure was gaseous only, full body decontamination is not necessary.
7. If applicable, inform victim to take a full but ordinary shower once they arrive home.
8. Place clothing and personal items in a container.
  - Label or tag container.
  - Release bagged clothing to victim to be washed in laundry cycle at home.
9. Provide victim with clean clothing if necessary.
10. Treat and release to self.

**Always Wash and Rinse in a head-to-toe fashion. If eye irritation is present, flush eyes with water for 15 minutes or longer.**

## **Incapacitating (Riot Control) Agents**

### **1. Incapacitating Agents Examples**

MACE (CN), CNS, CS, CR, Pepper Spray, Choropicrin

### **2. How Incapacitating Agents Work**

These agents are irritants to the skin, eyes, and respiratory system. They are designed to work within seconds of contact. They dissipate quickly. Their intent is to incapacitate or render the target non-functional for a short period of time.

### **3. Incapacitating Agents Symptoms**

Symptoms may vary slightly from product to product. Overall, they cause various degrees of “burning sensations”, pain to eyes, and extreme discomfort to respiratory systems. Rarely do they produce serious effects. Symptoms begin to subside within 10 minutes to 1 hour.

#### **General symptoms include:**

- Nose - nasal secretions.
- Eyes – Burning, itching, reddening, tearing, swelling of eyelids.
- Mouth – Drooling, salivation.
- Airway - coughing, shortness of breath.
- Skin – Itching, tingling, possible redness, possible swelling or blistering of sensitive skin.
- Other – Nausea, dizziness, temporary difficulty breathing, diarrhea.

### **4. Incapacitating Agent Triage**

#### **High Priority for Decontamination:**

- Only those victims that have been enveloped in a particularly dense cloud of an incapacitating agent for an extended period of time, or splashed with liquid of an incapacitating agent, should be considered for possible decontamination or cleansing.

#### **Low Priority for Decontamination:**

- Victims subjected to a short or intermittent exposure of an incapacitating agent do not need to undergo decontamination. Removal to fresh air is adequate. Medical attention to stabilize respiratory distress may be a priority.

### **5. Incapacitating Agents Decontamination**

All victims should be evaluated for the need for decontamination, the urgency for decontamination, as well as the degree to which decontamination should be applied. Most will only require removal of outer layer of clothing, and nothing more. Remember, these incapacitating agents dissipate and migrate rapidly, do not persist, and are not absorbed through the skin.

Most high priority victims may not be able to physically remove clothing or effect casual hygiene by cleansing themselves due to incapacitation. Consideration must be given to assist in such cases. The following are suggested basic decontamination steps for incapacitating agents:

1. Self-protection may be provided using turnout gear and SCBA.
2. Remove victim from contaminated area rapidly.
3. Address humanitarian concerns/public modesty if possible.
4. Allow for communication in victim’s own language if possible.



5. Remove only that clothing which may have come into contact with liquid.
  - Remove only the outer layer of clothing if contact was gaseous.
  - Removal of other layers of clothing may not be necessary if exposure was gaseous and was short or intermittent.
6. If it is determined that a whole body wash is recommended, follow decontamination recommendations for Industrial Chemical.
  - Otherwise wash affected area with mild soap and water.
  - Rinse 2-5 minutes with water.
  - Only the area in contact with liquid should need cleansing.
  - Full body decontamination is not necessary.
  - If clothing is removed as a precaution due to possible “off-gassing,” and exposure was gaseous only, full body decontamination is not necessary.
7. If applicable, inform victim to take a full but ordinary shower once they arrive home.
8. If applicable, inform victim to take a full but ordinary shower once they arrive home.
9. Place clothing and personal items in a container.
  - Label or tag container.
  - Release bagged clothing to victim to be washed in laundry cycle at home.
10. Provide victim with clean clothing if necessary.
11. Treat and release to self.

**Always Wash and Rinse in a head-to-toe fashion. If eye irritation is present, flush eyes with water for 15 minutes or longer.**

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## **Biological Warfare Agents**

Biological warfare agents can cause disease, illness, and death. Biological warfare agents are living microorganisms. They have been attractive to military applications and to terrorists to render havoc within a community and its infrastructure. Research conducted by military establishments has concentrated not only on the manufacture and stockpiling of biological warfare agents, but also on methods of dissemination, and improving virility.

Biological agents also include a special category of substances called toxins. These are pure chemicals, but are produced by a living microorganism or a living creature. They are traditionally included in the world of biological warfare agents. There are virus, bacteria, insects, plants, fungus and animals that can produce deadly toxins. Again, some military establishments and foreign country governments have developed stockpiles of toxin substances. Iran is strongly suspected to have an inventory of the “botulinum toxin” in sufficient quantity to kill every human being on the face of this planet.

Incidents involving biological substances are rare. In unannounced biological events, exposure to a biological substance may go undetected for a considerable period of time. Symptoms of exposure to a microorganism may appear many days

to weeks after the exposure. Symptoms of exposure to a toxin may be delayed a few hours to a few days. Only when victims are diagnosed as having been exposed to a biological agent by the demonstration of symptoms, will the full venue of the biological event be recognized. This is very unlike other incidents of exposure involving chemical substances.

When a biological event is suspected, it is recommended to consult with infectious disease specialists. Confirmation and technical support can be sought from the Center for Disease Control and Prevention (CDC) hotline (770) 488-7100.

It is not recommended that a full mass decontamination procedure be instituted at all biological incidents. This would be most impractical and ill conceived. Even with the dissemination of suspect mists or powders in a working environment (i.e. anthrax spores), an ordinary shower is a satisfactory resolve. Localized areas of the body that are suspect to have come into direct contact with a biological substance should only require immediate but ordinary hygiene cleansing.

Announced threats are most likely to be hoaxes, and initiating unnecessary decontamination procedures could lead to disgruntled civilians, potential legal action, and ridicule within the news media.

**FBI WMD Response  
Guidelines  
Appendix 4**

At the time of the event, if any questions arise about the need for decontamination, recommendations should be sought from the FBI in consultation with local, state, and federal public health officials. **In Appendix 4, the “FBI WMD Response Guidelines” covers specific situations involving biological agents.**

**It is important to note that it is a criminal act to make a threat or use any biological agent as a weapon, and any such act should be reported to the FBI immediately. It is important to work with law enforcement during a biological incident involving a criminal act to ensure the proper collection of evidence.**

**Biological Threat  
Response Flow Chart  
Appendix 5**

**In Appendix 5, a flow chart, provided by the Department of Health Services Emergency Preparedness Office, covers “Biological Threat Response: Guidance for Local Government.”**

The United States Military has developed recommendations for decontamination after biological agent exposure. These recommendations relate to military field operations in a battlefield environment *only*, including so-called *decontamination solutions*. Application of these recommendations in a civilian setting is not an appropriate response.

In those rare instances where decontamination or routine hygiene washing would be declared appropriate following a biological threat (as described above), careful washing with mild soap and water will be sufficient. This will remove most surface contamination. A soft bristled brush or soft washrag may be needed to ensure mechanical loosening from the skin, without abrasion, followed by rinsing with

copious amounts of water. This method is often all that is needed. It should be noted that the Center for Disease Control (CDC) in Atlanta, Georgia, has recommended to the emergency services community that ordinary mild soap and water be used for decontamination of suspect biological contact.

## **Triage**

### **Biological Agents Triage**

#### **High Priority for Decontamination:**

- Only those victims at an incident who have made direct contact with a microorganism or toxin.

#### **Low Priority for Decontamination:**

- Victims who have not made direct contact with a microorganism or toxin.
- Victims who might have been subjected to a mist, aerosol, or powder.

## **Decontamination**

### **Biological Agents Decontamination**

All victims should be evaluated for the need for decontamination, the urgency for decontamination, as well as the degree to which decontamination should be applied. Most will only require removal of the outer layer of clothing, and nothing more. Remember, these biological agents are dispersed as powders or mists and settle out quickly. Because they settle out close to the point of introduction, they are considered persistent. They are not easily absorbed through the skin.

If victims are already demonstrating symptoms of poisoning upon arrival of emergency service personnel, the contaminant is not biological but more likely chemical. Victims should not be demonstrating symptoms at a suspect biological incident. It is probable that some victims might have come into contact with a suspect substance. Verification of direct contact of a liquid or powder is essential, as it will be these victims that should be considered for on-scene hygiene cleansing or decontamination of the contacted skin area. Verification of non-direct contact victims will not need immediate cleansing or decontamination. This includes aerosols, mists, and vapors. It may be determined that outer clothing is collected for later laboratory testing. If decontamination is necessary, the following are suggested basic decontamination steps for biological agents:

1. Self-protection may be provided using turnout gear and SCBA.
2. Remove victim from contaminated area.
3. Address humanitarian concerns/public modesty if possible.
4. Allow for communication in victim's own language if possible.
5. Remove only that clothing which came into direct contact with liquid or powder.
  - Remove only the outer layer of clothing if contact was vapor, mist or airborne dust.
  - Full body decontamination is not recommended if only isolated parts of the body were affected.
  - Wash affected area with mild soap and water.

- Rinse 2 – 5 minutes with water.
  - If applicable, inform victim to take a full but ordinary shower once they arrive home.
6. For victims, who did not come into direct contact with substance, but might have been in the vicinity of a mist, vapor cloud, or airborne dust.
    - Provide the opportunity for them to take an ordinary shower, or release them to engage in shower at home, per on-scene technical advice.
    - Collect outer layer of clothing as per on-scene technical advice.
  7. Place selected clothing and personal items in a container.
  8. Label or tag container and victim.
  9. Provide victim with clean clothing as necessary.
  10. Release to medical or EMS management for victim to be attended and monitored by physician.
  11. If clothing is released to victim, normal laundering, using a hot water wash cycle and mechanical drying is effective and will remove microorganisms from clothing. Bleach maybe used in the wash cycle to provide additional disinfection.

**Always Wash and Rinse in a head-to-toe fashion. If eye irritation is present, flush eyes with water for 15 minutes or longer.**

## Radiological Materials

Radiological materials are derived from several sources:

### Sources of Radiological Materials

SUBSTANCE	Source
Raw Materials	Uranium, Radium, Plutonium, Cesium, Radon, etc.
Weaponized Military Sources	Bomb Devices, and Precursors to Bomb Manufacture
Refined Industrial Sources (Energy)	New and Spent Nuclear Fuel Rods
Refined Industrial Sources (Technical)	X-Ray Machines; Laboratory Analysis; Medical Research

Great care is exercised in the manufacture, transportation, distribution and use of these materials in the United States. They are very heavily regulated. However, accidents, theft, loss of inventory, and mismanagement can lead to these materials falling into the hands of individuals with criminal intent to use them. Every year there are reports of industrial grade radiological sources missing or stolen from various inventories. Some spent nuclear fuel rods are known to be unaccounted for. Additionally it is rumored, however unlikely, that the former Soviet Union has lost track of several so-called “suit case” nuclear bomb devices.

Mass victims involving radioactive contamination of the community in a terrorist

incident probably will occur as a result of refined industrial energy sources or refined industrial technical sources that are lost, stolen or involved in an accident, or from a Radiological Dispersion Device (RDD), also known as a “dirty bomb.” Contamination, as a result of the use of a clandestine nuclear device detonation, is indeed a concern to our national security, however it is considered to be the least likely of all possible potential acts of radiological terrorism.

## Dispersal

### Radiation Dispersal Device (RDD)

A Radiation Dispersal Device uses conventional explosives as a method to disperse radioactive material over a wide area. This in turn would have the consequence of potentially contaminating a large area with radioactive dust and would create both an external and internal ionizing radiation hazard to victims.

## FBI WMD Response Guidelines Appendix 4

**It is important to note that it is a criminal act to make a threat or use any weapon for mass destruction, and any act should be reported to the FBI immediately. It is important to work with law enforcement during a radiological incident involving a criminal act to ensure the proper collection of evidence. Appendix 4 contains the FBI WMD Response Guidelines.**

Ionizing radiation consists of gamma, cosmic, and x-rays, beta particles, alpha particles, and neutron particles. When ionizing radiation passes through living tissue, either from an external source (primarily gamma and sometimes beta) or an internal source (alpha, beta, neutron), it can change the structure of living cells, damaging or destroying them. These cellular changes can promote cancer, genetic changes, birth defects, or death. Ionizing radiation sources principally come from the radioactive isotopes of many elements. There are hundreds of radioactive isotopes, also known as radionuclides.

### Examples of Radioactive Isotopes, and Their Uses

SOURCE	Radiation	Uses
$^{235}\text{U}$	Alpha	Fission bombs
$^{235}\text{U}$ , $^{240}\text{Pu}$	Alpha	Fusion bombs; Reactor fuel
$^{238}\text{U}$	Alpha	Breeder reactors; Atomic fuel rods
$^{239}\text{Pu}$	Alpha, Neutrons	Reactor fuel rods
$^{60}\text{Co}$ , $^{131}\text{I}$ , $^{137}\text{Cs}$ , $^{139}\text{Ba}$ , $^{141}\text{Ba}$	Beta	Instruments; Medical; Industrial
$^{234}\text{U}$ , $^{228}\text{Ra}$	Beta, Gamma, Neutrons	Research; Medical; Industrial
$^{60}\text{Co}$ , $^{132}\text{I}$ , $^{134}\text{Cs}$ , $^{140}\text{Ba}$	Gamma	Instruments; Medical

#### Effects and Symptoms Radiological Agents Effects and Symptoms

The effects of a radiation dose are either prompt or delayed. Prompt effects occur within hours to months, and are as a result of a single massive exposure in excess of 300 - 500 rem. Delayed effects occur over many years, and may be the result of single or accumulative exposures ranging between 25 – 200 rem.

The clinical effects of doses of 500 (+ or -) rem are typically symptomatic, i.e. nausea, vomiting, loss of hair, weakness, anemia. Whereas, the clinical effects of doses between 25 – 200 rem are not typically symptomatic. Instead, cancers and genetic defects are prone to develop.

The table “Radiation Dose Perspective” shows the symptoms and effects of exposure to radioactive sources with respect to dose intensity:

## RADIATION DOSE PERSPECTIVE

Dose, in rem	Source and Effects
0 – 25.0 millirem	No detectable clinical effects
2.5 millirem	Cosmic radiation dose from average airline flight
10 millirem	One chest x-ray
25 millirem	Yearly exposure living next to a nuclear power plant
25 – 100 millirem	Slight transient reduction in white blood cells
31 millirem	Average yearly background radiation dose, sea level
75 millirem	Average yearly background radiation dose, Lake Tahoe
80 millirem	Average yearly medical and dental dose
5 rem	EPA “Protective Action Guideline” for emergency workers
25 rem	EPA guideline for once-in-a-lifetime exposure
75 rem	EPA guideline for once-in-a-lifetime lifesaving work
100 – 200 rem	Reduction in white blood cell production
200 – 300 rem	Diarrhea, anemia, reduction in red blood cell production
300 – 400 rem	Vomiting within hours, bone marrow is destroyed, 25% mortality
400 – 500 rem	All white blood cells destroyed, 50% mortality
Over 500 rem	Mortality > 75% within weeks of exposure

## Triage

### Radiation Agents Triage

#### High Priority for Decontamination:

- Victims who were covered with radioactive dust.
- Victims who were enveloped in radioactive smoke.
- Victims who are highly suspect of having been exposed to otherwise invisible airborne radiation and presumably inhaled it.

#### Low Priority for Decontamination:

- Victims who were not in direct contact with any radioactive dust, powder or vapor.
- Victims, who might have been within the vicinity of an incident, but were not downwind.
- Victims who were not in a situation where they inhaled the radioactive material.

## Decontamination

### Radiological Agents Decontamination

Decontamination of radiation agents is fortunately very basic. A mild soap acts as an excellent surfactant, the surfactant improving the efficiency of water to cling onto solid (powder) debris. Most radiological deposits upon skin surfaces will be powders and fine dusts. It is this contaminant that must be removed. Non-sophisticated cleansing, washing, and decontamination using ordinary mild soaps and water are highly efficient. The following are suggested basic decontamination steps for radiological agents:

1. Self-protection may be provided using turnout gear, SCBA, and radiological detection devices.
2. Additional self-protection is afforded by minimizing the amount of the time of exposure, maximizing the distance from the source, and utilizing available shielding.
3. Remove victim from contaminated area.
4. Address humanitarian concerns/public modesty if possible.
5. Allow for communication in victim's own language if possible.
6. Remove only that clothing which may have come into direct contact with radioactive liquid, dust or powder, or was enveloped in radioactive smoke.
  - Whole body decontamination is not recommended if only isolated parts of the body are affected.
  - Wash only affected areas with mild soap and water.
  - If whole body decontamination is warranted, wash only with mild soap and water.
  - Rinse 2 – 5 minutes with water.
  - Confirm contamination removal with radiation detection device.
  - If applicable, inform victim to take a full but ordinary shower once they arrive home.



7. Place selected clothing and personal items in a container.
8. Label or tag container and victim.
9. Explain to victim procedures that will be instituted for the possible professional cleaning of personal clothing and items, and how they may be retrieved at a later date and place.
10. Provide victim with clean clothing as necessary.
11. Release to medical or EMS management for need for victim to be attended and monitored by physician.
  - This will be of particular importance for inhaled contamination, and the threat of internal radiation hazard.

**Always Wash and Rinse in a head-to-toe fashion. If eye irritation is present, flush eyes with water for 15 minutes or longer.**

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## References

1. NIOSH/OSHA/USCG/EPA, Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities.
  2. U.S. Army Soldier and Biological Chemical Command, Guidelines for Mass-Casualty Decontamination During a Terrorist Chemical Agent Incident.
  3. US Army Handbook, Medical Management of Biological Victims.
  4. US Army Handbook, Medical Management of Chemical Victims.
  5. Hazardous Materials Medical Management Protocols, California Emergency Medical Services Authority Hazardous Materials Advisory Committee.
  6. Medical Aspects of Chemical and Biological Warfare.
  7. The Health Physics and Radiological Health Handbook, Wudeon Lectern Associates
  8. Jane's Chem-Bio Handbook California Law Enforcement.
  9. United States Environmental Protection Agency (US EPA) Recognition and Management of Pesticide Poisonings.
  10. California EPA, Department of Pesticide Regulation's Guidelines for Hazardous Materials Response to Pesticide Exposures.
  11. Hazardous Materials Injuries A Handbook for Pre-Hospital Care.
  12. Agrochemical and Pesticide Safety Handbook.
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# CHAPTER FIVE

## DECONTAMINATION BASICS

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### Introduction

This chapter addresses:

- Contamination and exposure
  - Decontamination Corridors
  - Self-decontamination
  - Decontamination methods (physical and chemical)
  - Decontamination authority
  - Prioritizing Victims
  - Communication between the field, the hospital, and the public
  - Transportation of victims to the hospital
- 

### Contamination and Exposure

Contamination can spread due to the uncontrolled migration of a hazardous material in a gaseous, liquid, and/or solid phase. This spread of contamination can threaten people, animals, objects, or the environment, and may contribute to secondary contamination of rescue personnel, transport vehicles, and hospital emergency facilities. Some contaminants may persist in skin, hair or personal belongings, and may jeopardize First Responders, health care workers, and other attendants. Refer to the Contamination Risk Factors Chart in Chapter 4 regarding examples of persistency and migration.

### Break Through Factors

Contaminants contacting the victims clothing or First Responders structural fire fighting or personal protective clothing may permeate, degrade, and/or penetrate (break through) their clothing, eventually reaching their skin and causing an unexpected exposure.

Five major factors affecting the ability for hazardous materials to break through clothing are:

Victims

- Contact time: The longer a contaminant is in contact with clothing, the greater the probability and extent of permeation, degradation, and penetration. For this reason, minimizing contact time is one of the most important objectives of a decontamination program.
- Concentration: Molecules flow from areas of high concentration to areas of low concentration. As concentrations of hazardous materials increase, the potential for contamination of clothing increases.
- Temperature: An increase in temperature generally contributes to the

increased permeation, degradation, and penetration rates of contaminants.

- Size of contaminant molecules and clothing pore space: Permeation and penetration increases as the contaminant molecule becomes smaller, and as the pore space of the material increases.
- Physical state of hazardous materials: Gases and vapors have a tendency to permeate and penetrate more readily and faster than liquids, and liquids more readily and faster than particulates and powders.

Typically, the highest threat of exposure to secondary contamination at hazardous material incidents will be from acute exposure not chronic exposure. An acute exposure is a one-time exposure to a hazardous material at a sufficiently high concentration, while a chronic exposure is one that occurs repeatedly over long periods of time to a hazardous material of low concentration. An acute exposure to highly persistent substances will therefore encourage the potential for increased health threat to First Responders and civilians.

If the hazardous material is removed before it can enter one or more of the pathways (inhalation, skin absorption, ingestion, or through a puncture wound), the potential for exposure to secondary contamination is considerably reduced. Therefore, the quicker the hazardous material is removed from the victim(s) and/or First Responders, the less chance it can cause an unexpected exposure.

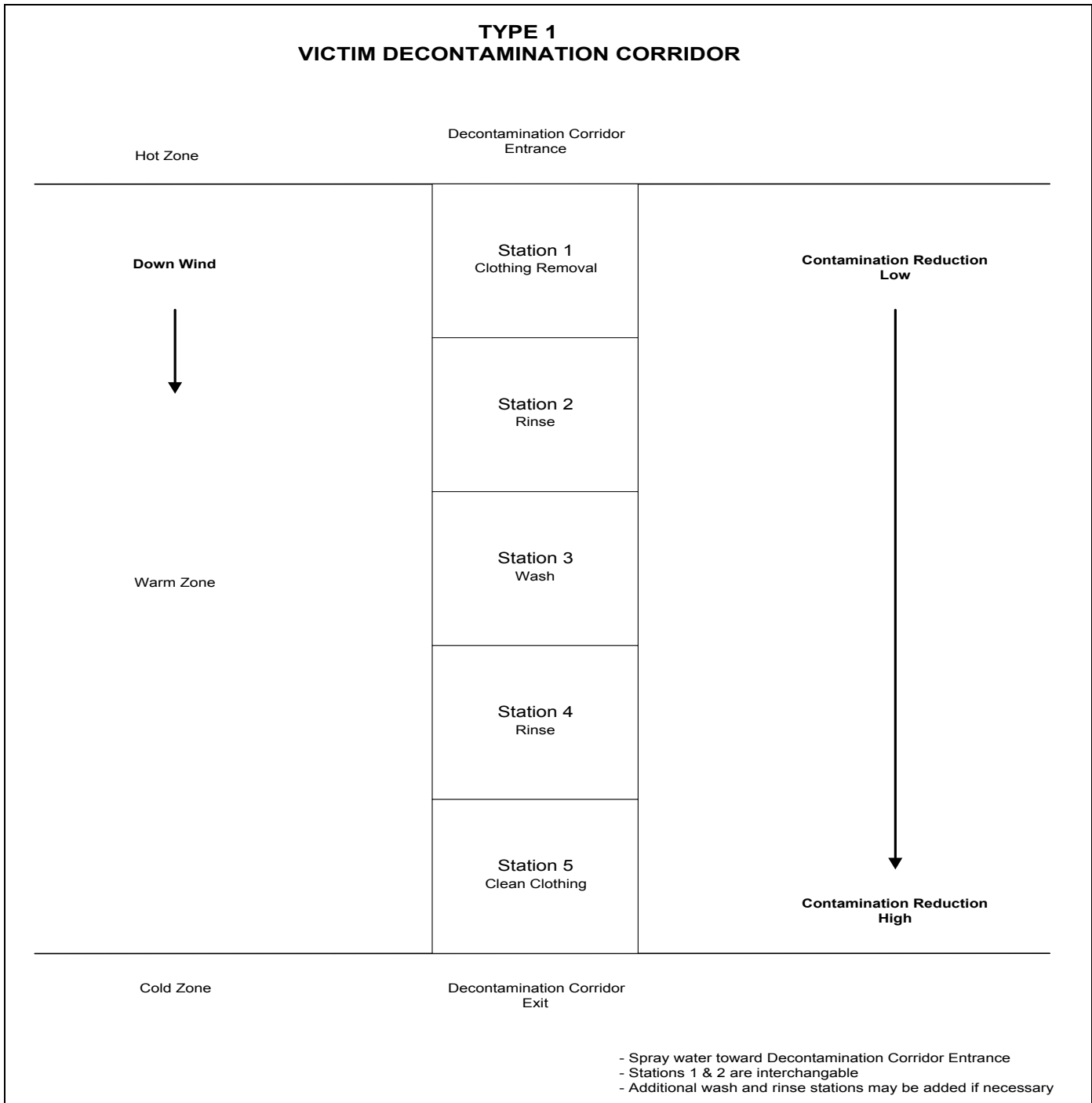
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## **Decontamination Corridors**

The prevention or diminution of exposure depends on a systematic decontamination process. Each operation should be performed at a separate decontamination station. The arrangement of stations forms a decontamination corridor, which is located inside the contamination reduction zone (warm zone). Typically, the decontamination corridor is set up in a straight line to allow for the continual reduction of contamination.

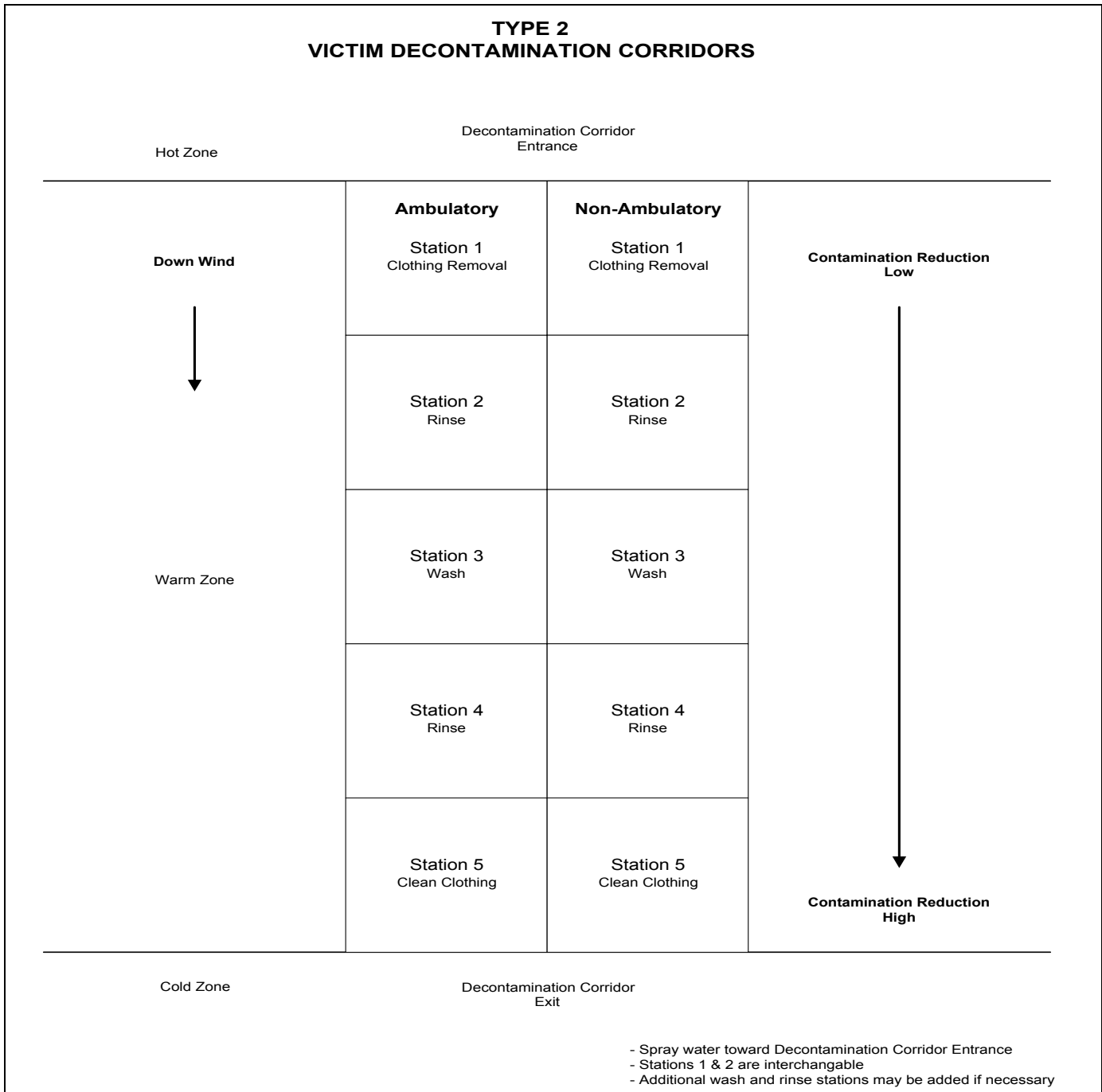
The following Type 1 diagram is a basic Victim Decontamination Corridor, which can be modified to accommodate ambulatory and non-ambulatory victims as in the Type 2 diagram. The basic corridor can be modified for other needs as well like separating genders.

**TYPE 1  
VICTIM DECONTAMINATION CORRIDOR**



- Spray water toward Decontamination Corridor Entrance
- Stations 1 & 2 are interchangeable
- Additional wash and rinse stations may be added if necessary

**TYPE 2  
VICTIM DECONTAMINATION CORRIDORS**



**Self-Decontamination** Because time is a critical factor when decontaminating victims, allowing the victims to self-decontaminate can speed up the decontamination process. This will contribute to the possible reduction of staffing needs by First Responders. Further, victims who are able and allowed to self-decontaminate will often be more

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thorough and more efficient. And, finally, allowing self-decontamination will reduce issues and concerns of modesty.

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## **Decontamination Methods**

**The “decontamination solution” endorsed by this document shall be mild soap and water. No other so-called decontamination solutions should be used in an arbitrary manor by First Responders.**

Decontamination may be accomplished by a number of different methods. Physically removing the outer layer of clothing, and then administering a cleansing procedure (including self-decontamination) are two of the more common and efficient methods of removing the contamination threat. When employing either method or the combination of the two, one must plan to limit splashing and arrange for the collection of debris and runoff, in order to reduce or prevent secondary contamination. Rapid skin, eye, and wound decontamination is of primary concern.

There are many physical methods available to utilize. However, the resources immediately available to First Responders may be limited due to expenses for purchasing specialized physical and chemical decontamination equipment and the ability to transport such equipment. First Responder decontamination procedures are contained in several instructional courses offered by OES California Specialized Training Institute, should be more than adequate for local response authorities to adopt and employ.

## **Effective Decontamination**

**For decontamination to be effective, it should:**

- Minimize contamination and secondary contamination caused by an incident;
- Minimize the exposure of a victim during the removal of contaminated clothing (always remove contaminated clothing and wash victim from head-to-toe);
- Address humanitarian concerns/public modesty;
- Allow for communication in victim’s own language;
- Decontaminate personal effects and clothing involved in an incident;
- Confine contamination to the site of an incident; and
- Allow rapid medical response without contaminating the EMS personnel, emergency transport vehicles or equipment, or medical treatment facility.

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## **Physical Decontamination Methods**

Some physical decontamination methods to remove a contaminant from a victim or First Responder are:

- Removing clothing,

- 
- Rinsing with water,
  - Brushing, scrubbing,
  - Absorption,
  - Vacuuming,
  - Applying pressurized air, and
  - Evaporation/vaporization.

## Clothing Removal

### 1. Removal of Clothing/Personal Items

Removing clothing from a victim or a First Responder contributes to the removal of a large portion of the contaminant. However, extreme care must be taken in the removal of contaminated clothing in order to prevent the spread of contaminants to areas of the body not yet affected. Clothing, like a shirt, removed over the head could expose the mouth, nose, and eyes directly to the hazardous material. Therefore, unbuttoning or cutting off the garment and allowing it to fall away from the victim's body may be a preferred removal method. If the victim is upright and wearing contaminated clothing, the shirt or top should be cut in the back, starting at the top and finishing at the base of the back. By starting at the top, the contaminants fall away from the body.

Arrangements might be made to allow for victims to remove their own contaminated clothing. If so, it must be determined that the contaminant is not immediately life threatening, advice from medical specialist are in support of this arrangement, and the victim will immediately follow with a full personal hygiene wash. Remember to separate victims by gender and provide cover unless the time to do that would jeopardize their health and safety.

When to remove clothing is often a question of controversy but it need not be. A question often posed to First Responders is, should the removal of clothing occur prior to, during, or after the first water wash and rinse? If there is any doubt, this question should always be resolved by keeping the following in mind:

- a. Application of water to a dry garment contaminated with an unknown dry powder may trigger the release of a toxic or corrosive vapor. Further, if the skin had not been previously in contact with the dry powder, it certainly will be upon the application of water. Both can be avoided by removing the garment first.
- b. If the garment is already damp or wet from a liquid spill, the contaminant is probably already migrating to the victims' skin. Application of water will only speed up or guarantee dermal contact. Further, the application of water will spread the liquid contaminant to encompass a larger surface area of the victims' body, worsening the situation.

Considering these possibilities, the removal of clothing should always be the

first priority, prior to any wash and rinse procedure. At least the outer layer of suspect contaminated clothing should be removed before the application of water. One rare exception would be a situation where a victim has been splashed with a highly corrosive liquid (i.e. a car battery blew up), saturating the outer layer of some clothing clear to the skin. Immediate burning and skin destruction proceeds rapidly. It is imperative that large quantities of water be applied quickly, then remove clothing, and then proceed with a full decontamination process.

Personal items and valuables such as rings, purses, wallets, earrings, cell phones, pagers, etc., must be removed, bagged, and tagged. See Chapter 3 Handling Personal Items for suggestions on collecting, identifying, storing, and claiming personal items.

## **Water Rinsing**

### **2. Water**

Water is the universal solvent. More substances can be dissolved or suspended in water than any other liquid medium. The efficiency of water's ability to function as a great solvent can be enhanced by the use of mild soaps. Soaps act as a "surfactant", which is a substance that reduces surface tension and allows for water to "wet" other molecules, particularly non-polar solvents such as oily substances and powders. This is also known as "water softening".

A simple rinse with water immediately dilutes water soluble substances and polar solvents, and they are flushed away with great efficiency. However, if there are powder contaminants on the surface of the skin (and in the hair), or the contaminant is a non-polar solvent, these will not be completely removed with a simple water wash.

The use of a mild soap as a surfactant improves the decontamination process two ways:

- a. The surfactant properties of soap enable the water to trap and dilute a wider range of contaminant substances, both liquid and solids, and;
- b. The surfactant properties of soap also "soften" the natural body oils on the surface of the victim's skin. Body oils are usually good absorbents of contaminants, and it takes a surfactant (mild soap) to remove these body oils. This enhances the removal and flushing off of these contaminants that would otherwise not be affected by a simpler water wash.

## **Brushing/Scrubbing**

### **3. Brushing/Scrubbing/Scraping**

Brushing/scrubbing is a technique occurring simultaneously during the application of water during the wash and rinse. Only soft bristled brushes should be supplied and used. For scrubbing, sponges can be used. The object is to use brushes and/or sponges to encourage the release of



contaminants that are adhering to the surface of the skin due to body oils, sweat, and grime. Stiff bristled brushes and coarse sponges should be avoided as they may cause damage to the skin such as abrasion allowing for secondary contamination.

Even with the use of soft bristled brushes and sponges, care must be taken not to irritate wounds, blisters, existing skin irritations, and lesions. When possible, it is best to let the victim conduct their own thorough cleansing of wounds and lesions.

## **Absorption**

### **4. Absorption**

Absorption is the utilization of a medium to remove the contaminant from the victim like a towel soaking up a spill. Soft cloth towels, damp sponges, chemical absorbent pads, and paper towels are often used for this purpose. This is usually a slow process, and should only be considered when the contaminant is not a serious skin damaging agent or high health hazard. It also does not negate the need for a follow up wash and rinse. Even after the bulk of a contaminant has been removed by the process of absorption, residual and unseen amounts of some contaminants will remain on the surface of the skin, and only a thorough wash and rinse will assure their removal.

## **Vacuuming**

### **5. Vacuuming**

Vacuuming is the process where air suction removes solid contaminants such as powders and particulates from the victim. Vacuuming can lead to the spread of contamination. When vacuum systems pull contaminants from the victim's clothing or body, disruptions in the vacuuming pressure due to mechanical problems or wind can allow some contaminants to be released into the air. This process is seldom employed because it is not considered efficient, and the necessary tools needed are typically not readily available.

## **Pressurized Air**

### **6. Pressurized Air**

The pressurized air technique is used to remove contaminants, like dust particles, by blowing them off the victim. This technique can lead to the spread of contamination. Blowing contaminants off victims will allow contaminants to be released into the air. It is because of these shortcomings that this process is not popularly employed.

## **Evaporation/ Vaporization**

### **7. Evaporation/Vaporization**

Evaporation is the process whereby a contaminant is allowed to vaporize because it has a boiling point below the ambient temperature. Typically, this technique is not used during emergency response because it is timely and can increase the level of and the potential for exposure. However, it must be remembered that some liquid contaminants do naturally evaporate

exceedingly fast. A few examples are Carbon disulfide and Carbon tetrachloride. These substances evaporate so fast that the skin will actually chill. If victims were contaminated with these substances, there may be a residue remaining on their skin and deposited within their body oils. This residue can be removed by routine wash and rinse procedures.

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## **Chemical Decontamination Methods**

Chemical decontamination methods are the application of so-called chemical decontamination solutions directly to the external body. The use of decontamination solutions is highly controversial, and accidents have happened where the victim was actually injured by the application of the decontamination solution. Therefore, this document does not support the use of any decontamination solutions for dermal cleansing due to the dangers they may pose. See the “Decontamination Solutions” section in Chapter 4 for further explanation.

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## **Decontamination Authority**

### **Authority**

Local Government agencies, including fire departments, law enforcement agencies, health departments, and others all execute their respective roles for decontaminating the public under the authority provided by California’s Constitution. The Constitution allows local government to make and enforce ordinances to protect the order, safety, and health of society so long as they are not in conflict with the general laws of the state.<sup>1</sup> The broad authorities of local agencies are often described in city and county charters or local ordinances. Agencies that are involved in any type of hazardous material emergency response should consult with their local government’s legal counsel to understand the full range of authorities and responsibilities that apply to this type of activity within their community.

### **Limits**

Generally, the people that are or may be contaminated by a substance are willing to allow First Responders to take appropriate decontamination measures to protect the people’s health. There may be unique circumstances where individuals do not want to be decontaminated by a public agency for a number of reasons, including religious beliefs and culture mores (see Chapter 3 – Humanitarian Efforts). In many of these circumstances, self-decontamination or other methods of cleaning may be adequate. Compelling an individual against their will to be decontaminated would only be a legally viable option in unique and extreme situations where a contaminated person is likely to harm others, is not willing to self-decontaminate, and they are not willing to segregate him or herself from others. It is unlikely that the constitutionally required legal protections for compelling decontamination (e.g. right to appeal the decision) could be effectively made available in the time necessary for most decontamination measures to be effective. First Responders considering the option of forcing a person to be decontaminated against his or her will should consider that, in addition to potentially violating the person’s civil rights, they may also be subjecting themselves and their agency to various criminal and civil charges, including civil assault and false imprisonment.<sup>2</sup>

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### **Other Considerations**

State law provides some options for controlling people that choose not to undergo decontamination. The First Responders must critically consider the severity of the contamination and the likelihood a person's decision to refuse decontamination will result in harm to others. The state allows for imprisonment or confinement of a person for "the protection of the public peace or health or of individual life or safety."<sup>3</sup> In addition, if a person's refusal to decontaminate could harm a child, or if that person is a parent or guardian who refuses to allow his or her child to be decontaminated and this will cause the child to be injured, law enforcement officials can intervene.<sup>4</sup> Likewise, if a person willfully interferes with the First Responders, who are conducting the decontamination, there may be grounds for arrest.<sup>5</sup>

If a mass decontamination is conducted during a declared state of emergency, the powers of local government are enhanced due to the exigencies of the emergency.<sup>6</sup> Although still limited by state and federal law, a local agency may adopt ordinances or rules that become effective during a declared emergency and that may provide unique authorities that facilitate mass decontamination.<sup>7</sup> A declared emergency will also provide additional immunities from liability for the agencies and individuals conducting the decontamination operations.<sup>8</sup>

Although beyond the scope of this guidance, note that local health officers have special authorities for controlling the spread or further occurrence of any contagious, infectious, or communicable disease.<sup>9</sup> These authorities include the ability to isolate individuals who are contaminated with these diseases.<sup>10</sup>

Further, during a spill or release of a hazardous waste or material, the health officer may declare a "health emergency" if there is an immediate threat to public health.<sup>11</sup> This declaration could be important in some decontamination situations, as it enables the health officer to obtain all necessary information about the material spilled from the entity with custody of the material, including an entity that may be transporting the material. This authority is in addition to responsibilities placed upon entities handling hazardous material by other laws that require them to provide government with information about materials and their potential hazards. The declaration also enables the health officer to sample, analyze, or otherwise determine the identifying and other technical information relating to the health emergency or county health emergency as necessary to respond to or abate the county health emergency and protect the public health.<sup>12</sup>

1. Fitts v. Superior Court (1936) 6 Cal. 2d 230, 234; Cal. Const. Art. XI, § 7
2. See California Civil Code §43, personal rights and §1714 regarding false imprisonment.
3. Government Code §202
4. Penal Code §273a
5. Penal Code §148
6. Government Code §8558 (c)
7. Government Code §8634
8. Government Code §8655
9. Health and Safety Code §120175
10. Health and Safety Code §120215
11. Health and Safety Code §101080
12. Health and Safety Code §101085

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## **Prioritizing Victims**

The need for victim decontamination, the methods of decontamination to be employed, and the order in which victims will be processed based upon urgency, must be determined by instituting a decontamination triage concept for the incident. Additionally, the number of victims possibly contaminated by a hazardous material at an incident may exceed the First Responders' capabilities to effectively rescue, decontaminate, medically treat and evacuate them. Therefore, in order to provide the greatest benefit for the greatest number of victims, First Responders must prioritize victims.

### **► Factors That Determine Highest Priority for Victim Decontamination**

There are many factors to consider when establishing a priority for the injured to be decontaminated. The following are not listed in any specific order, instead, they should all be considered equally in order to determine high, medium, and low priority needs for victims:

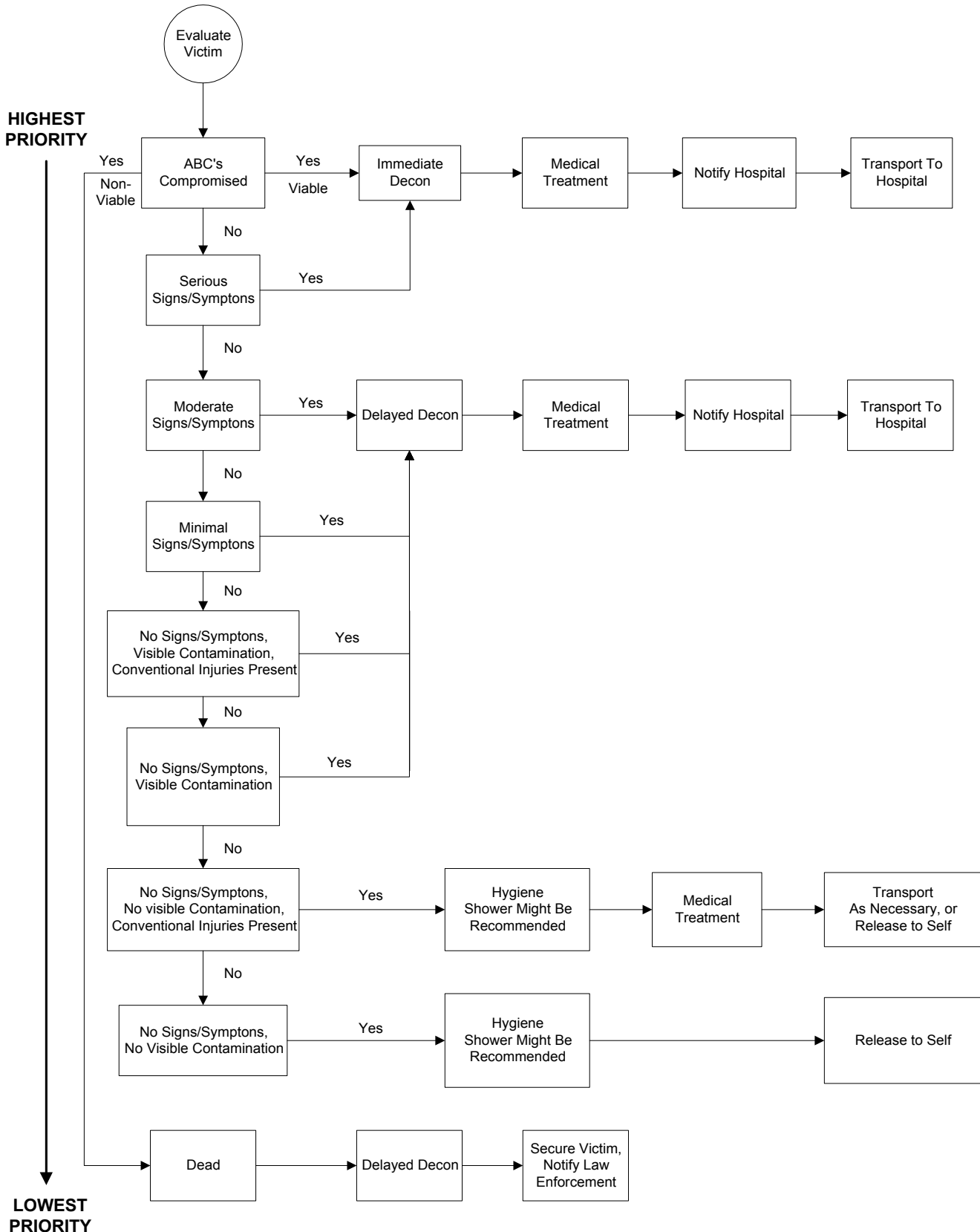
- Victims closest to the point of release.
- Victims whose airway, breathing, or circulation (ABCs) has been compromised.
- Victims exhibiting exposure signs or reporting exposure symptoms.
- Victims with evidence of contamination on their clothing or in or on their body.
- Victims with conventional injuries.

Victims will be either ambulatory or non-ambulatory. Who receives a higher priority for triage and decontamination will be based upon an analysis of the above factors by First Responders on scene, and supported by other information and resources as provided by the Incident Commander. If available, poster boards and/or cards, as discussed in Chapter 3, can be used to direct ambulatory victims to self-decontamination and free First Responders to decontaminate non-ambulatory victims.

Those civilians at an incident determined not to be contaminated should be assembled in a safe refuge area. They should be monitored and observed by emergency medical personnel. Individuals not necessitating on-scene decontamination may be instructed later upon their release to take a full hygiene shower once they return to their home.

On the following page is the Multi-Casualty Mass Decontamination Triage Flow Chart for determining the priorities for victim decontamination.

## MULTI-CASUALTY MASS CASUALTY DECONTAMINATION TRIAGE MATRIX



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**Communication  
Between the Field, the  
Hospital**

In an ideal world, all the contaminated victims at a HazMat incident would be completely decontaminated before they arrive at hospital emergency departments. However, in the real world, contaminated victims may leave the incident prior to the arrival of First Responders and go directly to a hospital. In addition, victims rescued and transported to a hospital are typically only externally decontaminated at the incident and can still present a threat for secondary contamination by releasing internal contamination externally (i.e., vomiting, excretion, etc.). Upon arrival, the victims may contaminate the hospital personnel, patients or the emergency room, resulting in the partial or complete shutdown of the hospital and expansion of the HazMat incident.

To prevent closure of medical facilities due to secondary contamination, there must be immediate communication and coordination with hospitals. This will ensure hospitals are prepared and capable to receive real or potentially contaminated patients. Many counties and cities use different communication models. In some areas, communication occurs by direct radio communication with the nearest hospital(s), or in other areas, communication occurs through base hospital systems, EMS agencies or by automated electronic notification. Local jurisdictions should develop collaborative response plans that include the immediate communication and coordination of area hospitals and emergency departments.

**Hospital  
Information Needs**

Local hospitals need pertinent information about the incident to prepare for victim arrivals:

- Name of hazardous material.
- Hazardous material effects.
- Hazardous material properties (chemical and physical).
- Contamination signs.
- Exposure signs and symptoms.
- Proactive actions to prevent secondary contamination.
- Decontamination actions administered.
- Protective clothing and equipment.
- Number of victims requiring transportation.
- Age/gender.
- Nature of injuries.
- Vital Signs.
- Treatment being administered.
- Estimated time of arrival.

**Hospital  
Capabilities**

Unfortunately, the ability of hospitals to decontaminate victims varies widely. Some facilities are unequipped to handle such a task. Therefore, prior to the transport, the Incident Commander must know their local hospitals' capabilities:

- Can the hospital decontaminate victims?
- Does the hospital have the proper personal protective equipment to

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handle the HazMat material?

- Is hospital staffing available to decontaminate?
- Have prior arrangements or agreements been made for the hospital to receive contaminated victims?

Once the capabilities are known, the Incident Commander can communicate to other emergency personnel and the public, through the appropriate emergency channels, where victims can receive necessary medical attention.

### **Recommendations for Hospitals**

Contact the State of California Emergency Medical Services Authority and the Office of Statewide Health Planning and Development for the following recommendations for hospitals to glean from in developing their in-house response to victims involved in hazardous materials incidents:

- Recommendations for Hospitals: Chemical Decontamination Staff Protection Chemical Decontamination Equipment and Medication List Evidence Collection
- Recommendations for Hospitals Addressing Water Containment and Run Off During Decontamination Operations
- Healthcare Decontamination Facilities

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### **Transporting Victims to a Hospital**

Contaminated victims must not be transported in transport vehicles such as ambulances, buses, or helicopters. First Responders should make every attempt to remove surface contaminants from victims to prevent the spread of secondary contamination to transport vehicles and medical facilities. Despite these efforts, secondary contamination is always a threat. Victims can vomit or excrete ingested or off-gas absorbed hazardous materials. Therefore, EMS personnel, transport vehicles, and medical facilities must prepare for situations in which contamination cannot be totally eliminated. This preparation is for ground transportation only. Helicopter transportation of previously contaminated victims should not be allowed. If an "in transit" emergency arises, ground transportation vehicle drivers have the advantage of securing their vehicle immediately and evacuating. The helicopter pilot is not afforded this luxury.

### **Considerations**

Items to consider include:

- Appropriate preparation of the transportation vehicle for moving contaminated victims.
- Protective actions to be taken to prevent contamination spreading in the vehicle.
- Protective clothing and equipment recommended for use by the EMS personnel.



## **Secondary Contamination Preventions**

Vehicle and EMS personnel preparation to prevent contamination include:

Covering exposed surfaces that victims are likely to contact with plastic sheeting or bags.

- If possible, using washable fiberglass backboards rather than wooden (porous) backboards to carry victims.
- Using plastic bags to contain contaminated waste, gloves, etc.
- Containing irrigation fluids administered en route to hospital.
- Protecting respiratory equipment used to administer oxygen to victims.
- Immediate availability to breathing apparatus for the EMS personnel.

First Responders at the scene must communicate to EMS personnel and receiving hospitals vital information regarding the status of each victim in transport. This is best accomplished by the implementation of the Medical Group Supervisor or the Transportation Group Supervisor.

In dealing with certain HazMat situations or hospital capabilities the option may be to not transport victims to a hospital, but to leave them on scene or to transport to an alternative treatment site. Depending upon the magnitude and severity of the incident, it may be determined that a temporary hospital facility and morgue be set up at the scene.

Hospitals should be clear regarding the designation of receiving and unloading areas for contaminated victims. Some hospitals may desire to designate a different point of arrival from the normal emergency areas to limit secondary contamination to the hospital, medical staff, and other patients, although this is not done in all cases.

Contaminated victim emergency transport vehicles should not go back into service until thoroughly inspected and as necessary, decontaminated.

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## **References**

1. Jane's Chem-Bio Handbook California Law Enforcement.
  2. NOISH/OSHA/USCG/EPA, Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, October 1985.
  3. U.S. Army Soldier and Biological Chemical Command, Guidelines for Mass-Casualty Decontamination During a Terrorist Chemical Agent Incident.
  4. US Army Handbook, Medical Management of Biological Victims, Medical Aspects of Chemical and Biological Warfare.
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# APPENDICES

- Appendix 1**      Acronyms
- Appendix 2**      Glossary of Terms
- Appendix 3**      Technical Resource References
- Appendix 4**      FBI WMD Response Guidelines
- Appendix 5**      Biological Threat Response Flow Chart

# APPENDIX 1

## ACRONYMS

<b>ABC's</b>	Airway, Breathing, and Circulation
<b>DHHS</b>	Department of Health and Human Services
<b>EOC</b>	Emergency Operations Center
<b>EMS</b>	Emergency Medical Service
<b>EPA</b>	Environmental Protection Agency
<b>ESL</b>	English as a second language
<b>HazMat</b>	Hazardous Materials
<b>HERT</b>	Hospital Emergency Response Team
<b>ICS</b>	Incident Command System
<b>MSDS</b>	Material Safety Data Sheet
<b>OES</b>	Governor's Office of Emergency Services
<b>Rem</b>	Roentgen Equivalent Man
<b>RDD</b>	Radiological Dispersion Device
<b>SEMS</b>	Standardized Emergency Management System
<b>WMD</b>	Weapons of Mass Destruction

# Appendix 2

## Glossary of Terms

<b>Access Control Point</b>	The point of entry and exit from the control zones. Regulates access to and from the work areas.
<b>Acetylcholine</b>	A chemical neurotransmitter produced by nerve cells acting as a chemical “messenger” to stimulate the heart, skeletal muscles, and numerous secretory glands.
<b>Assisting Agencies</b>	Any agency that assists the jurisdictional agency at the scene of a hazardous materials incident by providing a service or support not within the immediate responsibility or capability of the agency having jurisdiction.
<b>Biological Agent</b>	Biological material that is capable of causing acute or long-term damage to living organisms.
<b>Chemical Agent</b>	A chemical substance that is intended for use in military operations to kill, seriously injure, or incapacitate people through its physiological effects. Usually divided into 5 groups: Nerve, Blood, Respiratory (choking), Incapacitating, and Blister (vesicants).
<b>Chemtrec</b>	The Chemical Transportation Emergency Center, operated by the Chemical Manufacturers Association (CMA), can provide information and technical assistance to First Responders. [Phone Number (800)-424-9300]
<b>Concentrate</b>	The undiluted hazardous material.
<b>Contamination</b>	An uncontained substance or process that poses a threat to life, health, or the environment.
<b>Contamination Reduction Zone (AKA Warm Zone)</b>	The area where personnel, equipment, and victim decontamination and exclusion zone support takes place. It includes control points for the access corridor and thus assists in reducing the spread of contamination. This zone is also referred to as the warm zone.
<b>Decontamination</b>	The physical and/or chemical process of reducing and preventing the spread of contamination from persons and equipment used at a hazardous materials incidents.
<b>Delayed Treatment</b>	Second priority in patient treatment because injuries are less severe.
<b>Degradation</b>	The loss in physical properties of an item of protective clothing due to exposure to chemicals, use, or ambient conditions.

<b>Dilute</b>	To thin down or weaken as by mixing with water or other liquid.
<b>Drift</b>	Hazardous materials being driven or carried along, as by a current of air or water, from the point of release.
<b>Emergency Operations Center</b>	The secure site where government officials exercise centralized coordination in an emergency. The EOC serves as a resource center and coordination point for additional field assistance. It also provides executive directives to and liaison for State and federal government representatives, and considers and mandates protective actions.
<b>Emergency Response Agency</b>	An organization that utilizes personnel trained in responding to different types of emergency situations.
<b>Emergency Response Personnel</b>	Personnel assigned to agencies that have the responsibility for responding to different types of emergency situations.
<b>Exclusion Zone (AKA Hot Zone)</b>	An area immediately surrounding a hazardous materials spill, where contamination does or could occur. The innermost of the three zones of a hazardous materials site. This zone is also referred to as the hot zone. Special protection is required for all personnel while in this zone.
<b>Exposure</b>	The subjection of a person to a hazardous material through any route of entry (inhalation, ingestion, absorption, or injection (punctured)).
<b>First Responder</b>	The first trained person(s) to arrive at the scene of a hazardous materials incident. May be from the public or private sector of emergency services.
<b>Hazardous Material</b>	Any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment.
<b>Hazardous Material Incident (AKA HazMat)</b>	The uncontrolled, unlicensed release of hazardous materials during use, storage, or transport that may impact the public health, safety and/or environment. This incident is also referred to as a HazMat Incident.
<b>Hospital Alert System</b>	A communications system between medical facilities and on-incident medical personnel, which provides available hospital patient receiving capability and/or medical control.
<b>Immediate Treatment</b>	A patient who requires rapid assessment and medical intervention for survival.
<b>Incident Command System (ICS)</b>	The combination of facilities, equipment, personnel, procedures, and communications operating within a common organizational structure, with responsibility for the management of resources to effectively accomplish stated objectives pertinent to an incident.
<b>Mass Decontamination</b>	A response activity requiring decontamination involving <i>significant</i> numbers of people.

<b>Minor Treatment</b>	These patients' injuries require simple rudimentary first-aid.
<b>Off-Gassing</b>	The vaporization of a hazardous material from the liquid or solid phase into the gaseous phase.
<b>Penetration</b>	The movement of liquid molecules through a chemical protective clothing, suit, garment or material.
<b>Permeation</b>	The movement of vapor or gas molecules through a chemical protective garment material.
<b>Personal Protective Equipment</b>	Equipment provided to shield or isolate a person from the chemical, physical, and thermal hazards that may be encountered at a hazardous materials incident. Adequate personal protective equipment should protect the respiratory system, skin, eyes, face, hands, feet, head, body, and hearing.
<b>Radiological Material</b>	Material(s) that undergo spontaneous disintegration of unstable nuclei accompanied by emission of nuclear radiation which could pose a significant or potential hazard to human health and safety or to the environment if released.
<b>Refuge Area</b>	An area identified within the exclusion zone, if needed, for the assemblage of contaminated individuals in order to reduce the risk of further contamination or injury. The refuge area may provide for gross decontamination and triage.
<b>Rescue</b>	The removal of victims from an area determined to be contaminated or otherwise hazardous. Rescue shall be performed by emergency personnel using appropriate personal protective equipment.
<b>Safe Refuge Area</b>	An area within the contamination reduction zone for the assemblage of individuals who are witnesses to the hazardous materials incident or who were on site at the time of the spill. This assemblage will provide for the separation of contaminated persons from non-contaminated persons.
<b>Secondary Contamination</b>	The spread of contamination from the initial person, object, or location contaminated to another.
<b>Support Zone (AKA Cold Zone)</b>	The clean area outside the contamination reduction zone. Equipment and personnel are not expected to become contaminated in this area. Special protective clothing is not required. This is the area where resources are assembled to support the hazardous materials operation.
<b>Triage</b>	The screening and classification of sick, wounded, or injured persons to determine priority needs in order to ensure the efficient use of medical personnel, equipment and facilities.
<b>Unified Command</b>	In ICS Unified Command is a unified team effort which allows all agencies with responsibility for the incident, either geographical or functional, to manage an incident by establishing a common set of incident objectives and strategies. This is accomplished without losing or abdicating agency authority, responsibility or accountability.

# APPENDIX 3

## Technical Resource References

The following is a list of suggested resource references to include in a hazardous material response team's library that can provide specific chemical toxicological information, chemical and physical properties, decontamination information, emergency medical guidance, and/or incident command information. All references should always be the latest available edition.

- Emergency Response Guidebook, U.S. Department of Transportation.
- Merck Index.
- Emergency Handling of Hazardous Materials in Surface Transportation, Association of American Railroads.
- Farm Chemicals Handbook, Meister Publishing.
- NIOSH Pocket Guide to Chemical Hazards, U.S. Department Health and Human Services.
- Hawley's Condensed Chemical Dictionary, Hawley.
- Dangerous Properties of Industrial Materials, Sax.
- Handbook of Toxic and Hazardous Chemicals and Carcinogens, Sittig.
- TLV and Beis: Threshold Limit Values for Chemical Substances and Physical Agents – Biological Exposure Indices, American Conference of Governmental Industrial Hygienists.
- Hazardous Material Injuries: A Handbook for Pre-Hospital Care, Stutz-Ulin.
- Emergency Care for Hazardous Materials Exposure, Bronstein-Currance.
- Clinical Toxicology of Commercial Products, Gosselin-Smith- Hodge.
- First Responder Chem-Bio Handbook: Practical Manual for First Responders, Tempest.
- Fire Service Field Operations Guide **[FOG]**, FIRESCOPE.
- Hazardous Materials Medical Management Protocols Second Edition, California Emergency Medical Services Authority Hazardous Materials Advisory Committee.
- Handbook of Radioactive Contamination and Decontamination, Severa/Bar.
- Agrochemical and Pesticide Safety Handbook
- Hazardous Materials Injuries A Handbook for Pre-Hospital Care
- Recognition and Management of Pesticide Poisonings, US EPA
- USAMRIID Manuals.

Note: This list does not imply a product endorsement, rather a library reference.

# APPENDIX 4

## FBI WMD Response Guidelines

**It is important to note that it is a criminal act to make a threat or use any weapon for mass destruction and any act should be reported to the FBI immediately.**

The guidelines below are provided by the FBI for responding to Weapons of Mass Destruction:

### 1. Anonymous caller indicating a WMD threat (including anthrax):

- Law enforcement response including local authorities and FBI agent.
- Fire department/HazMat response not recommended unless device or substance is found.
- Routine law enforcement investigation.

Investigative actions during this response may include:

- a. Information gathering at the scene.
- b. Building evacuation/search following local protocol.
- c. Taking control of the building ventilation system may be warranted based upon investigative findings.
- d. Attention should be focused on appliances or devices foreign to the surroundings.
- e. Included should be an assessment of the building ventilation system to rule out forced entry and tampering.

**Protective equipment should not be required unless hazards or risks are indicated.**

- Investigation similar to a telephonic bomb threat.
- Suspicious findings during investigation should initiate a public safety response including:
  - a. Fire/EMS/HazMat.
  - b. EOD team.
  - c. Notification per local plan that should include local and state health departments.
  - d. Notification per FBI plan.

### 2. Potential WMD device located:

- Follow local protocols for risk assessment and evaluation of potential explosive devices. Included in the response should be:
  - a. Law enforcement including local authorities and an FBI agent.
  - b. Fire/HazMat.
  - c. EOD team.



d. Local and state health departments.

- If explosive device is not ruled out, coordinate efforts with local/regional EOD authority and notify FBI Bomb Data Center (BDC).
- If explosive device is ruled out:
  - a. Evaluate for potential chemical, biological or radioactive filler.
  - b. If radioactive filler appears to be present, follow FBI plans for requesting additional assistance.
  - c. If no hazardous materials appear to be present, response continues as a law enforcement investigation.
- Device with potential chemical or biological filler or supplement:
  - a. Follow FBI ERT protocols for documentation or the crime scene.
  - b. Contain the package following recommendations from a hazardous materials authority. Assure notification of HMRU.
  - c. Options include double bagging, steel cans, polly containment vessels, or utilization of a hazardous materials over-pack.
  - d. Control the material as evidence and follow FBI plan for laboratory analysis.
- Potential release of WMD material from a device:
  - a. Control the ventilation system.
  - b. Follow protocols for a hazardous materials incident.
  - c. Evaluate the extent of contamination.
  - d. Evacuation of affected areas and decontamination procedures should be selected on the basis of an incident and risk assessment.
  - e. Provide medical attention following the recommendation from the local/regional public health medical authority.
  - f. Control and/ or isolate the hazard.
  - g. Treat as a FBI hazardous materials crime scene.
  - h. Request assistance from FBI/HMRU through local FBI.

**3. Specific situations – envelope with potential threat of biological material, letter opened and material present:**

- Public safety response including local authorities and FBI agent.
- Contain the package following recommendations from a hazardous materials authority: and
  - a. Options include double bagging, steel cans, polly containment vessels, or utilization of a hazardous materials over-pack.
  - b. Control the material as evidence and follow FBI plan for laboratory analysis.
- Provide medical attention/decontamination following the recommendations from the local/regional

public health medical authority.

- a. Evaluate the extent of contamination.
- b. Evacuation of the affected area and decontamination procedures should be selected on the basis of an incident hazard and risk assessment.
  
- c. Generally, medical prophylaxis and decontamination have not been indicated except for washing hands with soap and warm water.

**4. Specific situations – envelope with potential threat of biological material, letter opened and no material present.**

- Law enforcement response including local authorities and FBI agent
  - Fire department/EMS/HazMat response not recommended unless suspicious material is found or individuals are presenting symptoms.
- Handle the package following FBI ERT protocols:
  - a. Double bag the material and place in a suitable container such as an evidence paint can.
  - b. Control the material as evidence and follow FBI plan for laboratory analysis.
- No medical attention/decontamination is necessary unless symptoms are present, although local public health authorities should be notified.
- Handle as a law enforcement investigation.

**5. Specific situations – envelope with potential threat of biological material, letter not opened.**

- Law enforcement response including local authorities and FBI agent
  - Fire Department/HazMat response not recommended unless suspicious material is found;
- Handle the package following FBI ERT protocols;
  - a. Double bag the material and place in a suitable container such as evidence paint can.
  - b. Control the material as evidence and follow FBI plan for laboratory analysis;
- No medical attention/decontamination is necessary.
- Handle as a law enforcement investigation.

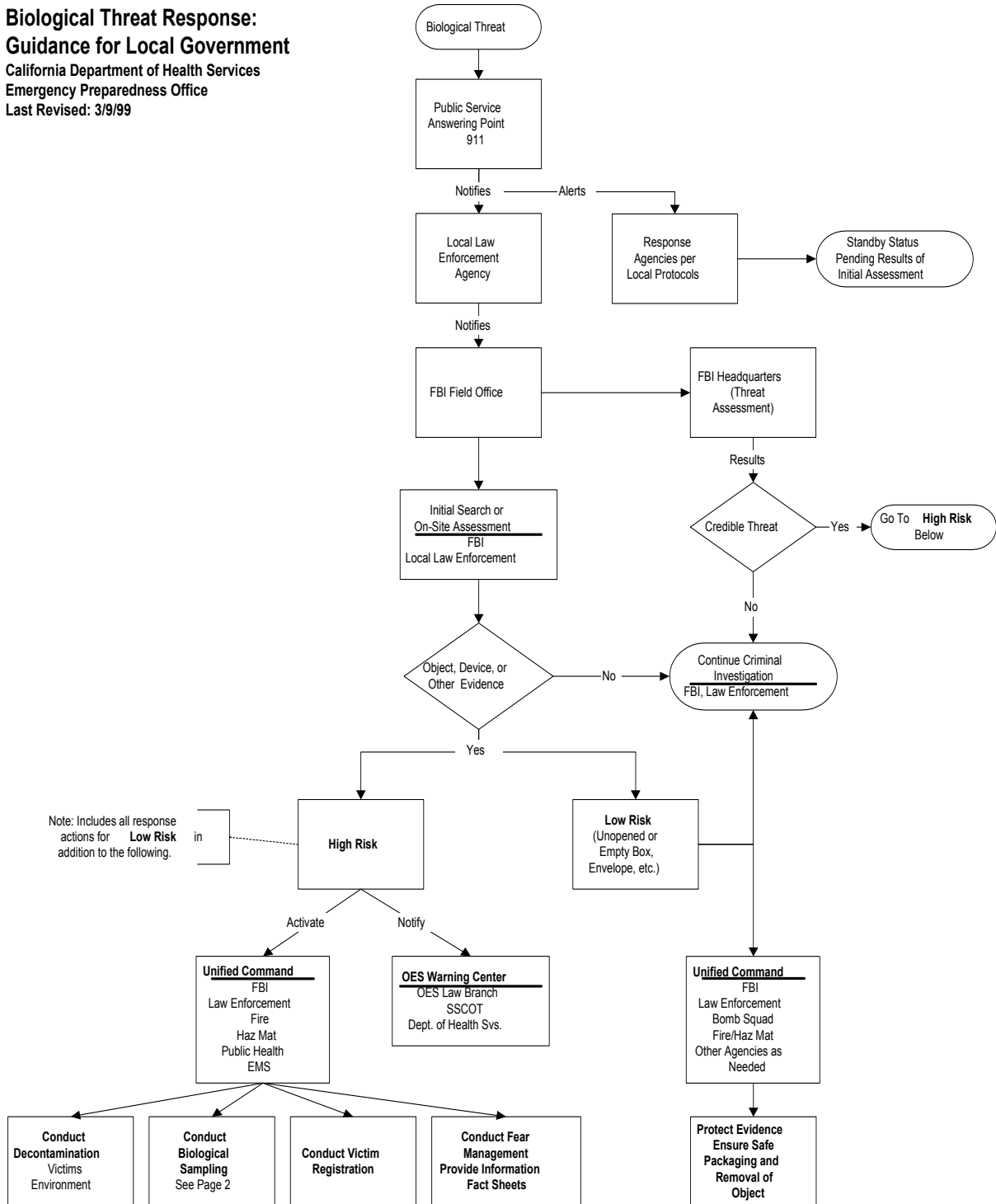
# APPENDIX 5

## **DHS Biological Threat Response: Guidance for Local Government**

The flow charts below were provided by the Department of Health Services Emergency Preparedness Office and covers "Biological Threat Response: Guidance for Local Government."

**Biological Threat Response:  
Guidance for Local Government**

California Department of Health Services  
Emergency Preparedness Office  
Last Revised: 3/9/99



**Biological Threat Response:  
Guidance for Local Government**  
California Department of Health Services  
Emergency Preparedness Office  
Last Revised: 3/9/99

